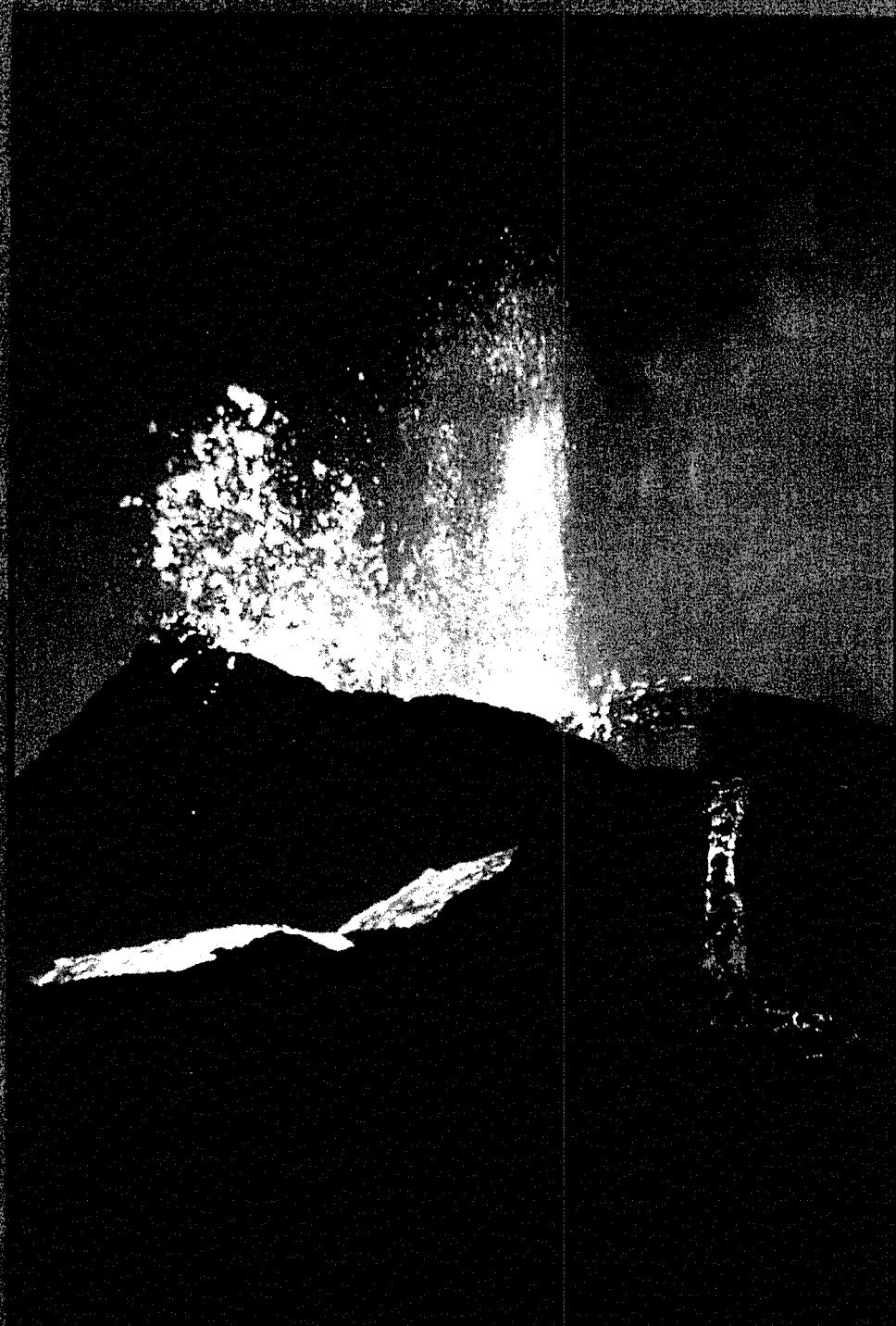


TEACHER RESOURCE BOOK

DYNAMIC SCIENCE

BOOK 2



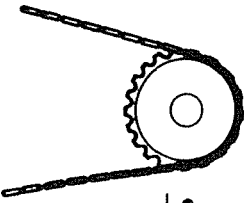
D. WILSON • M. BAUER

Which airliner can travel faster than 2300 km/h?

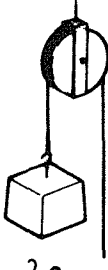
1. Match each diagram with the best description of its machine type.
2. Draw a line between the correct dots.
3. Each line will pass through a letter.
4. Use these letters to work out the answer.

Research

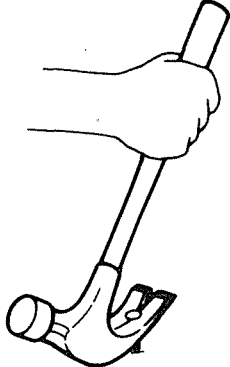
Find out all you can about this aircraft.



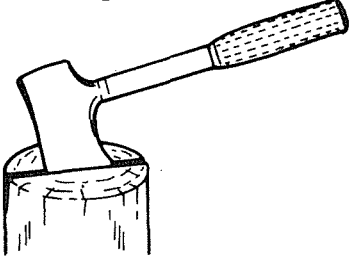
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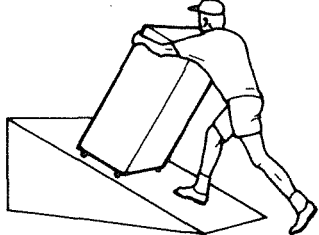
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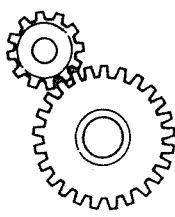
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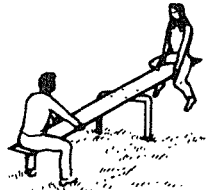
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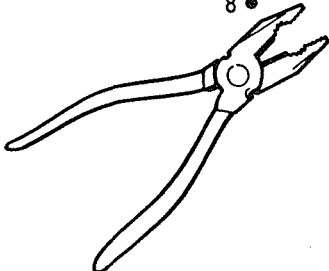
5 •



6 •



7 •



8 •

Letters in circles:

X, T, G, C, A, O, R, L, B, I, N, F, U, S, V, D, U, S, R, C, H, A, E, W, N

Descriptions and required answers:

- wedge •
- gears (2 answers required) •
- slope •
- lever (3 answers required) •
- pulley •



1	2	3	4	5	6	7	8
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Four famous scientists



























1. Write down the meanings of the first nine symbols:

- (a) _____ (d) _____ (g) _____
 (b) _____ (e) _____ (h) _____
 (c) _____ (f) _____ (i) _____











2. Using the code, work out the names of the famous women scientists listed below. What did each of these women do?

Note:  could be used instead of .



















CODE

A 	B 	C 	D 	E 	F 	G 	H 	I 
J 	K 	L 	M 	N 	O 	P 	Q 	R 
S 	T 	U 	V 	W 	X 	Y 	Z 	












Scientist number 1

Christian name					
Surname					












Scientist number 2

Scientist number 3

Scientist number 4

An enlightening problem

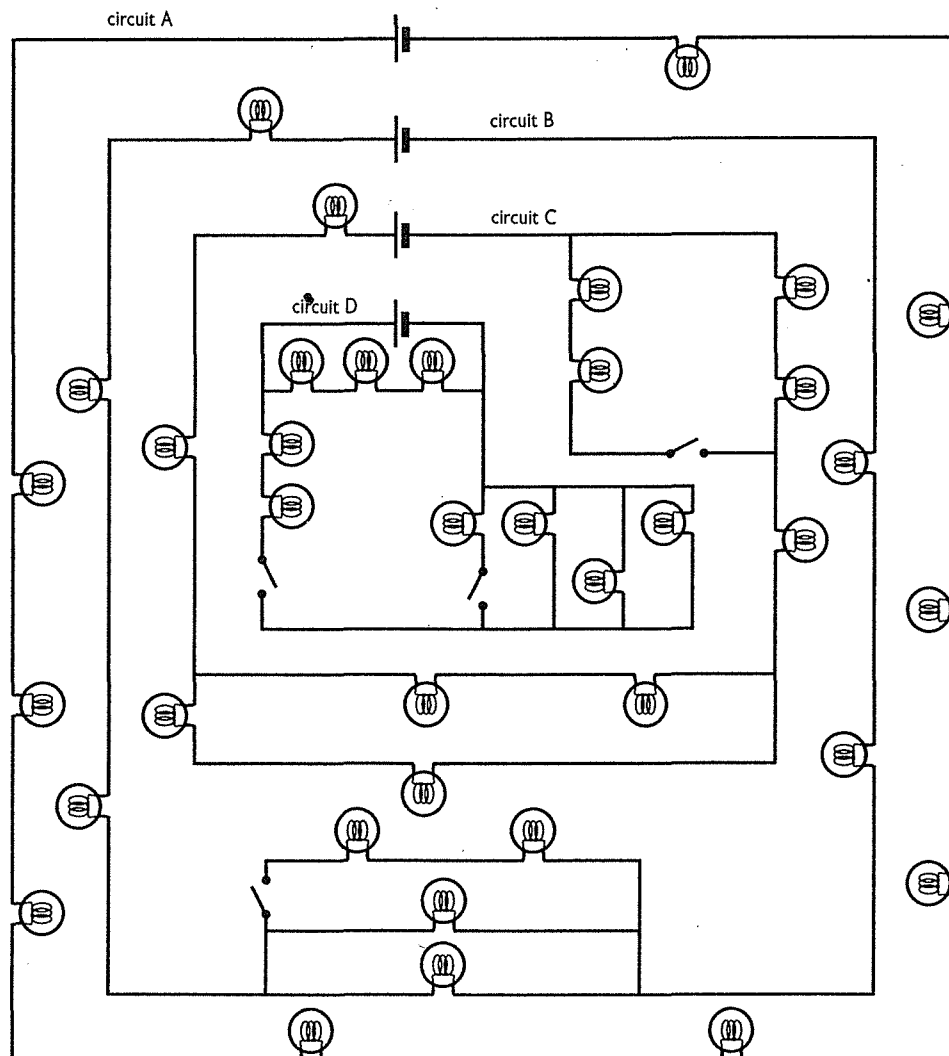
Claudette has four circuit diagrams (A, B, C and D) for the lights for the school disco. She needs to know how many globes are alight in each of the circuits.

- Trace over each circuit, one at a time, using a different colour for each circuit.
- Count how many globes are alight in each circuit and complete Claudette's notes below.
 Circuit A has ____ light globes glowing. Circuit C has ____ light globes glowing.
 Circuit B has ____ light globes glowing. Circuit D has ____ light globes glowing.

Extension

If all switches were closed, how many globes would be alight in

- Circuit A? ____
- Circuit B? ____
- Circuit C? ____
- Circuit D? ____



Machines and devices word maze

- Complete the missing words in the sentences.
- Find these words in the maze.
- Can you find other words in the maze? If so, make a list of them.

1. M_____ and d_v_____ make our lives easier.
2. Examples of simple machines include the l_____ and the wedge.
3. When a rope c_____ move over a wheel, the machine is called a p_____.
4. Wheels with t_____ are called gears. Sometimes these wheels may be called c_g_____.
5. Examples of levers include the r_k_____ used in the garden, the o_____ used to row a boat and the r_____ used for fishing.
6. Common useful devices include:
 - (a) p_____s for holding washing on the clothes line;
 - (b) k_y_____ used in l_____k_____ to improve security;
 - (c) clocks to tell the t_____;
 - (d) plumbing pipes and the t_ps to m_v_____ water inside our homes; and
 - (e) t_____p_____ and r_____o for communications.
7. Complex machines used for road transport include the c_____ and the b_____.
8. Some engines use electricity to power them. Other engines may use g_____ or s_____m_____.
9. When a small and portable source of power is needed, a b_____ can be used.
10. Components can be arranged in an electrical c_____ so that they are either in s_r_____ or in p_r_____.
11. C_r_t will f_w in a circuit if the circuit is complete.
12. Since the 1960s, more and more e_____r_____ components are being used in circuits. Components include c_p_____, and t_s_____s.
13. Electrical and electronic circuits may both contain r_s_____s.
14. Two types of structures are b_d_____s and tall buildings called s____-s_____.
15. There are four main types of bridges. These are the c_____, r_____, b_____, s_____ and a_____ bridges.

There may be a few more simple words in the puzzle too. See how many you can find.

(Continued)

Machines and devices find-a-word

C A N T I L E V E R C O G S T C R R
S N O D E V I C E S R A K E E A I A
U M O V E S Y E S M S Y E R L P G O
S B E I S T E A M A S T Y I E A I R
P R L N L F L O W C H A S E P C D O
E I E S E N L T R H I P L S H I B T
N D C U L W U A A I G R O D O T E S
S G T L L A P R D N H C C C N O A I
I E R A A E E C I E I A K U E R M S
O B O T R E G H O S N R S T I M E E
N U N O A L H O T R A N S I S T O R
A S I R P S W I T C H B A T T E R Y
T O C O N D U C T O R C U R R E N T

A simple and clever device

Before a lady invented filter coffee, coffee was made by wrapping the loose grounds in a cloth bag and boiling the bag in water. The coffee made using the old method was bitter and gritty.

Who did invent the filter coffee device that uses a paper filter?

- Answer the questions.
- Read the letters down the column indicated, to find the name of this person.

(Hint: Use Chapter 1, 'Machines and devices', and other books to answer the questions to solve the puzzle.)

1. These types of devices make life easier.
2. Sydney, Paris and Canberra all have a famous example of these structures.
3. A seesaw is a type of
4. When many electrical components are joined together they may form a complete
5. A diving board is a type of
6. The man who invented the light globe was
7. Small power sources used in torches are called
8. The simplest type of bridge is a rigid
9. A block and tackle uses a system of wheels and ropes. These wheels are called
10. Modern buildings are often constructed of steel and
11. Buildings and bridges are examples of
12. When there is an incomplete circuit no current flows. The reading on a meter would be

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

1 2 3 4 5 6 7 8 9 10 11 12

Library research

Use library books to find out where this lady was born and when she invented her useful device.

Comprehension: A very ancient device

In 1936 a strange container similar to a vase arrived at the Iraq Museum. The clay object contained a copper cylinder and an iron rod. Several people examined the device and decided that it may have been an ancient battery.

This object is now called the Baghdad battery. It is believed to be over 1800 years old. A *replica* of the device has been made. When fresh grape juice is added to the replica, the battery produces about half a volt of electricity.

Some people believe this ancient battery may have been used to *electroplate precious metals*.

In modern times Luigi Galvani (1737–98) and Count Alessandro Volta (1745–1827) have been given the credit for producing electricity. Galvani's work with animals and electrical *impulses* led Volta to develop the first electrical battery.

Volta's battery was made of a stack of zinc and silver plates. These plates were separated by paper soaked in salt solution. Volta did use his battery to electroplate precious metals.

Read the passage above and answer the following questions in full sentences in your notebook.

1. Use a dictionary to find the meanings of:
 - (a) replica
 - (b) impulse
 - (c) electroplate
 - (d) precious metal
2. Briefly describe the Baghdad battery.
3. How old is the Baghdad battery believed to be?
4. In modern times, who produced the first electrical battery?
5. How was his battery made?

Research

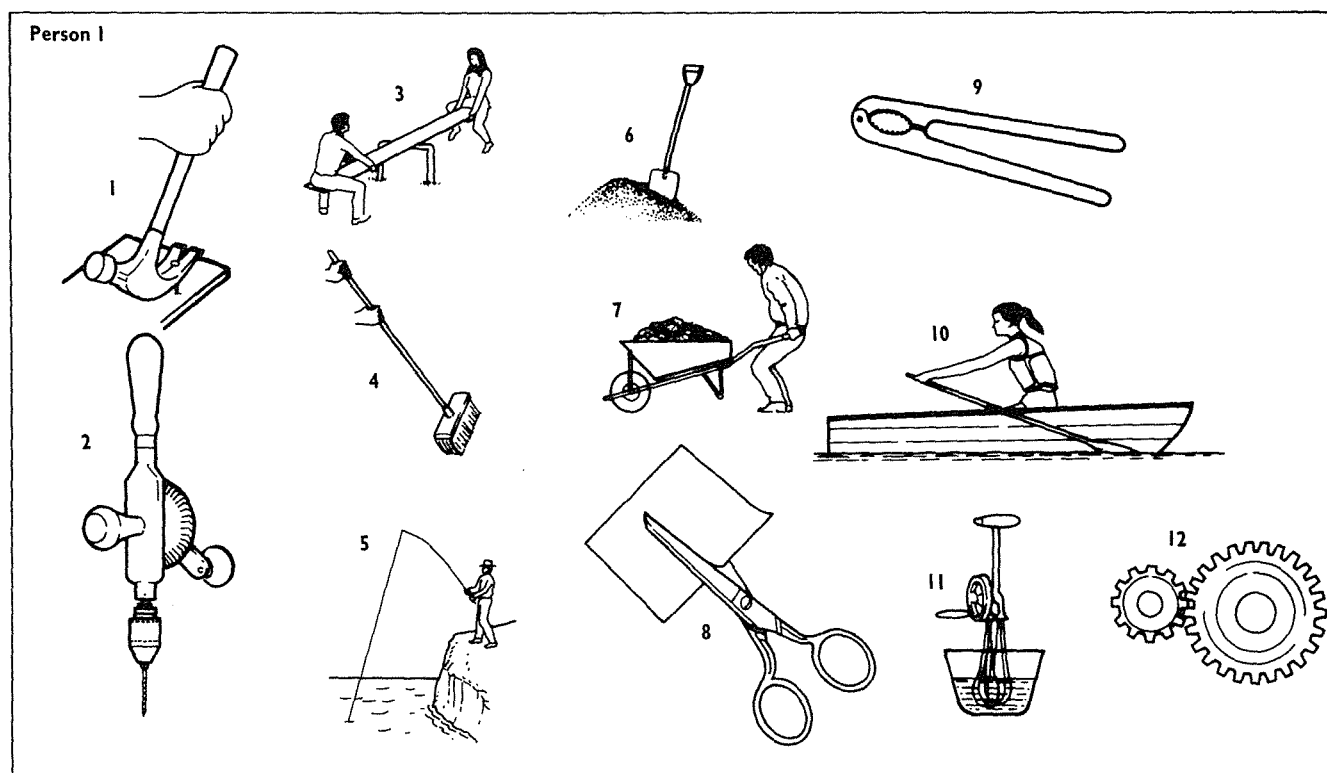
What substances are used in:

1. modern car batteries?
2. modern dry cell batteries?

Machines and devices barrier game

Person 1

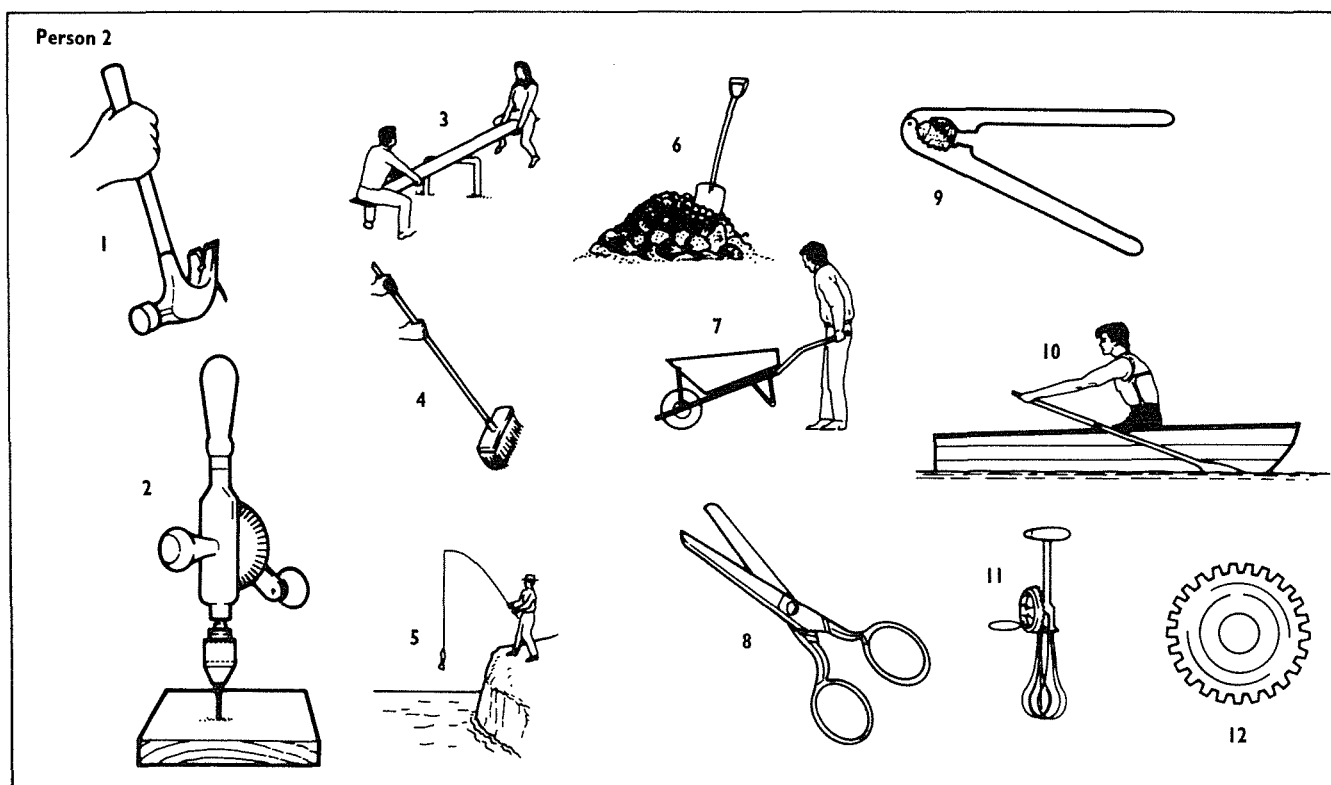
The aim of this game is to find out which of your pictures are the same as those of your partner and which of your pictures are different. Look carefully! Some of the differences are very small. In your notebook, record beside each number 1-12 whether your picture is the same or different.



Machines and devices barrier game

Person 2

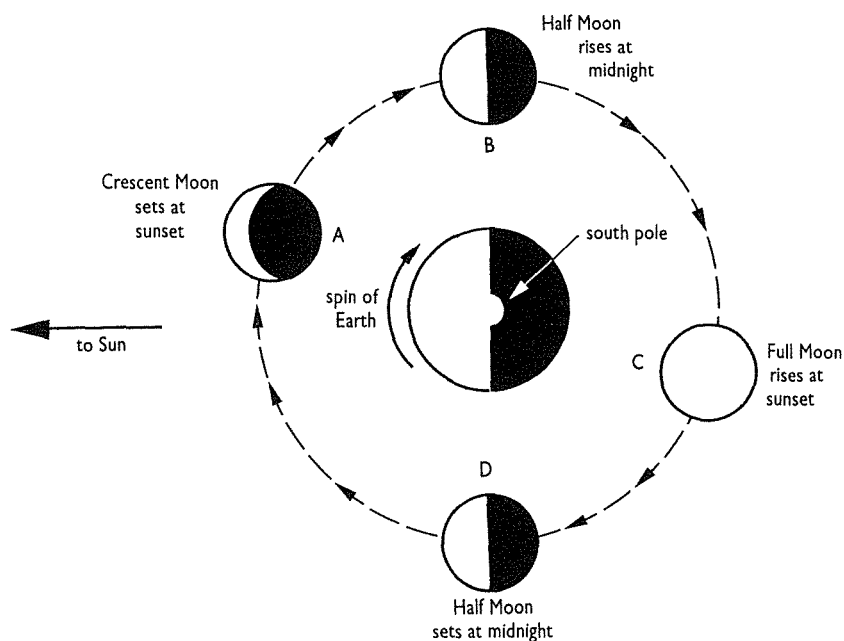
The aim of this game is to find out which of your pictures are the same as those of your partner and which of your pictures are different. Look carefully! Some of the differences are very small. In your notebook, record beside each number 1-12 whether your picture is the same or different.



Phases of the Moon

Write the date and colour in the Moon to record its appearance. Leave a space if you miss an observation.

Date:						
Date:						
Date:						
Date:						



After you have completed your 28 day chart showing the phases of the Moon, answer the following question:

What was the date that your observation corresponded to the following positions on the diagram above?

- A:
- B:
- C:
- D:

Comprehension: How far is that star?

Distances in space are huge. The distance to our closest star, the Sun, is 150 million kilometres. It is hard to write down the distances to other stars, let alone read or understand what such huge numbers mean. Consequently, scientists have decided to use a different unit for measuring distances in space. The unit that they chose was the *light-year*. The light-year is a huge number. It is the distance that light travels in a year.

Light travels at 300 000 km/s. In one year light would travel: $[300\,000 \times 365.25 \text{ days} \times 24 \text{ hours} \times 60 \text{ minutes} \times 60 \text{ seconds}]$ kilometres = 9 467 280 000 000 kilometres.

1 light-year is approximately 10 000 000 000 000 kilometres.

The nearest star to Earth apart from the Sun is the faint Proxima Centauri. It is 4.2 light-years away.

Alpha Centauri and Beta Centauri are the stars commonly called the pointers. The pointers point towards the Southern Cross. Alpha Centauri is the brighter of the two pointers. It is 4.3 light-years away. When we look at Alpha Centauri, we are seeing light that left the star 4.3 years ago. We are really looking into the past.

The nearest galaxy to Earth is the Andromeda galaxy. This galaxy is 2 million light-years away and so the light we see through our telescopes left Andromeda 2 million years ago. Our galaxy, the Milky Way, is thought to be about 100 000 light-years across and 10 000 light-years thick in the middle.

1. Why did scientists need a new unit to measure distances in space?
2. What is a light-year?
3. What is the nearest star to Earth?
4. How far away is Alpha Centauri?
5. Beta Centauri, the other pointer, is 490 light-years distant.
 - (a) What does this number mean?
 - (b) Are the two pointers really as close together as they seem to be, when we look at the sky?
6. Imagine you are an Andromedan, living on a planet in the Andromeda galaxy. You have an unbelievably high-powered telescope and you can see the living things on the Earth. What do you think you would be able to see? (*Hint:* You might need to look at Chapter 3 in *Dynamic Science Book 2*.)

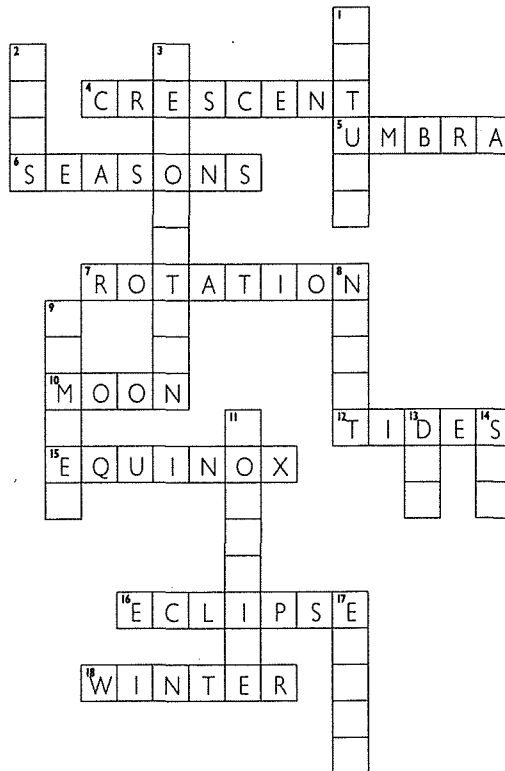
Research

The *parsec* is another unit used to measure distances in space. A parsec is a little more than 3 light-years. Use library books to find out more about the parsec.

Barrier crossword: Earth's most important neighbours

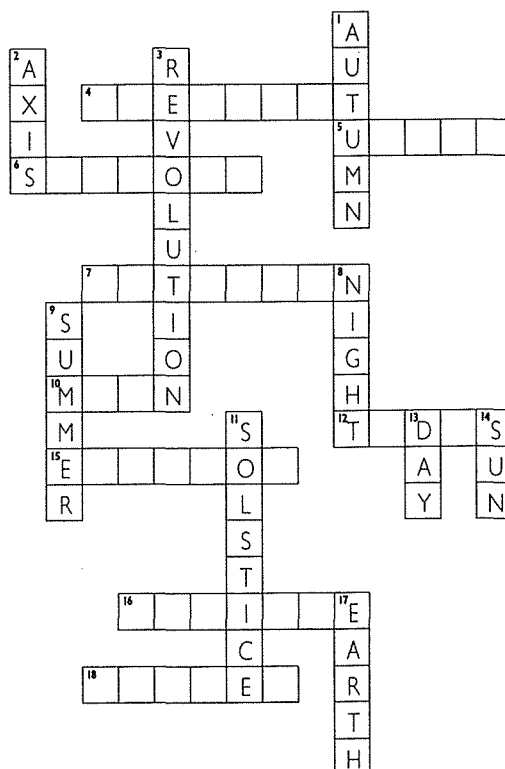
PUZZLE A

Across words



PUZZLE B

Down words



(Continued)

Traditional crossword: Earth's most important neighbours

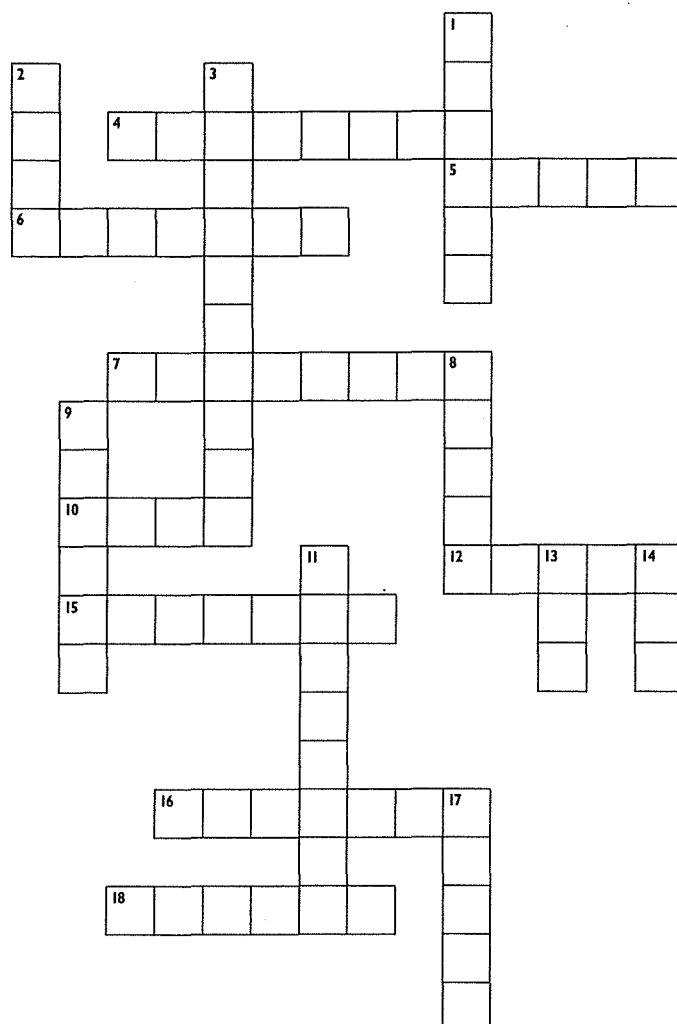
Clues

Across

4. A shape of the Moon
5. The darkest part of a shadow
6. The tilt of the Earth's axis causes these to happen on Earth
7. The spinning of an object about an axis
10. The brightest object in our night sky
12. The gravity of the Sun and the Moon causes these to occur on Earth
15. When day and night are of equal length
16. This occurs when one heavenly body passes in front of another
18. The time of year when the Sun's intensity is lowest

Down

1. A season when an equinox occurs
2. The Earth spins on this
3. The movement of the Earth around the Sun
8. The side of the Earth away from the Sun experiences this
9. The season when a solstice occurs
11. The longest or the shortest day
13. The side of the Earth facing the Sun experiences this
14. The source of light for the solar system
17. The only planet known to support life

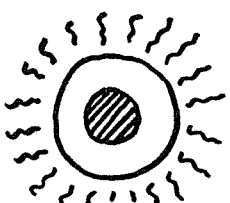
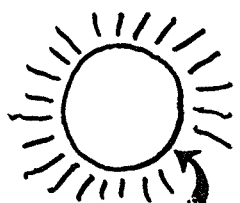
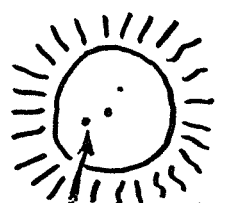
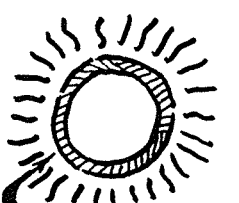
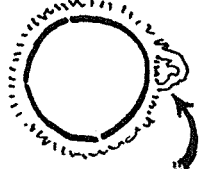
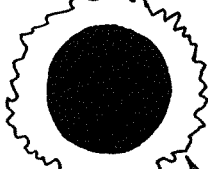





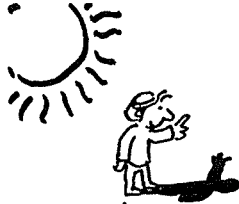


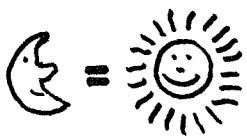

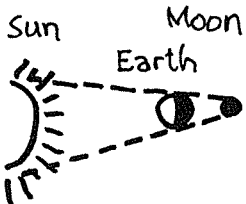
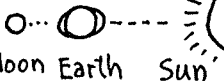
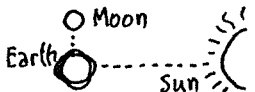



Bingo clues: Earth's most important neighbours

The innermost layer of the Sun <i>(the core)</i>	The surface of the Sun—most of the light comes from here <i>(photosphere)</i>	Bright patches on the surface of the Sun <i>(sunspots)</i>	The inner layer of the Sun's atmosphere <i>(chromosphere)</i>
Great eruptions that explode from the chromosphere <i>(prominences)</i>	Halo of the Sun that is only visible during an eclipse <i>(corona)</i>	How big is the diameter of the Moon? <i>(approx. 3500 km, the distance from Perth to Melbourne)</i>	Plains on the Moon were called this name by Galileo <i>(maria)</i>
Types of rock <i>not</i> found on the Moon <i>(sedimentary)</i>	Season when the Sun's rays are most intense <i>(summer)</i>	Season when the Sun's rays are least intense <i>(winter)</i>	Darkest part of a shadow <i>(umbra)</i>
Shortest day of the year <i>(winter solstice)</i>	Longest day of the year <i>(summer solstice)</i>	Equal length of day and night <i>(equinox)</i>	A solar eclipse <i>(diagram showing Sun—Moon—Earth)</i>
A lunar eclipse <i>(diagram showing Sun—Earth—Moon)</i>	The highest tides occur when ... <i>(the Sun, Moon and Earth line up and spring tides occur)</i>	Neap tides occur when ... <i>(the Sun and Moon are at right angles to the Earth)</i>	Part of a shadow that is not totally dark <i>(penumbra)</i>

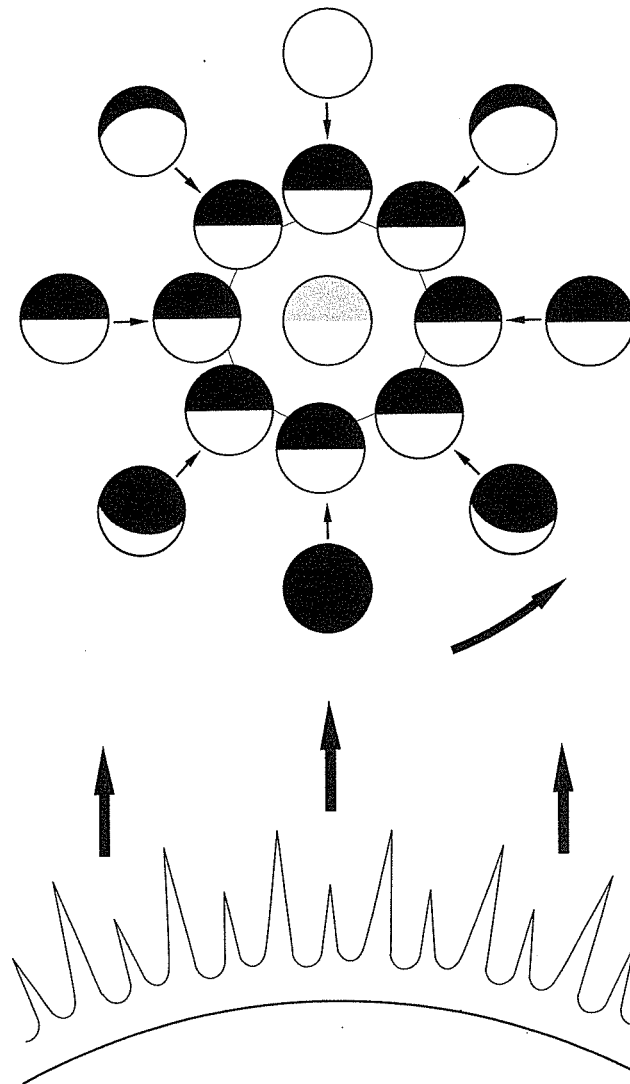
Answers are in brackets in italics. Do not read them out.

Bingo clues: Earth's most important neighbours

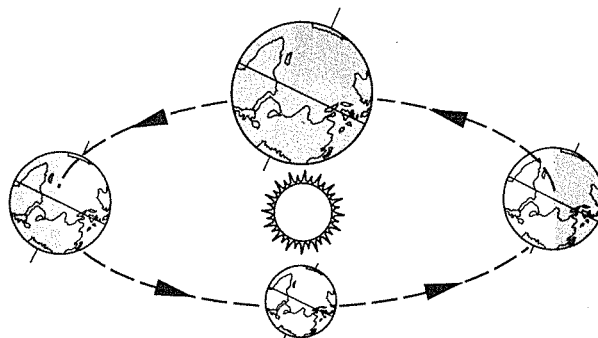
 <p>core of the sun</p>	 <p>photosphere</p>	 <p>sunspots</p>	 <p>chromosphere</p>
 <p>prominences</p>	 <p>corona</p>	 <p>approx. 3500 km, the distance from Melbourne to Perth</p>	 <p>maria</p>
 <p>sedimentary rock</p>	 <p>summer</p>	 <p>winter</p>	 <p>umbra</p>
 <p>winter solstice</p>	 <p>summer solstice</p>	 <p>equinox</p>	 <p>Sun Moon Earth</p>
 <p>Sun Moon Earth</p>	<p>the Sun, Moon and Earth line up, and spring tides occur</p>  <p>Moon Earth Sun</p>	<p>the Sun and Moon are at right angles to the Earth</p>  <p>Earth Moon Sun</p>	 <p>penumbra</p>

Diagrams of the phases of the Moon and the seasons

Phases of the Moon

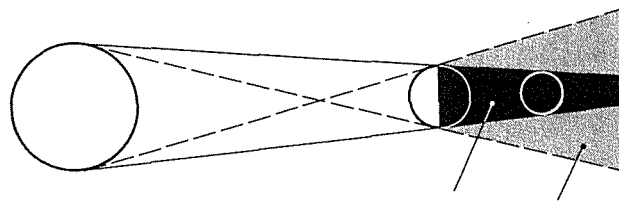
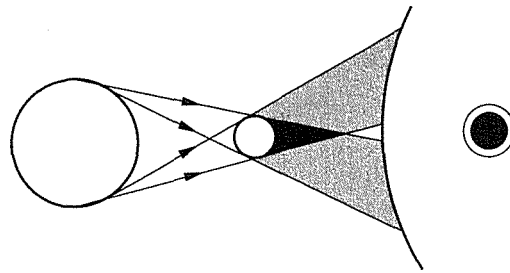
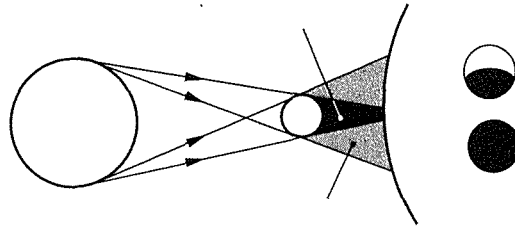


Seasons

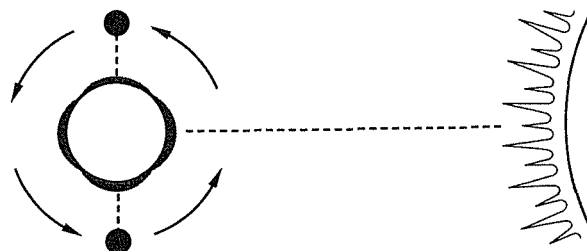
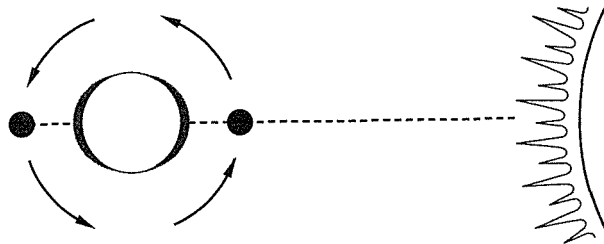


Diagrams of eclipses and tides

Eclipses

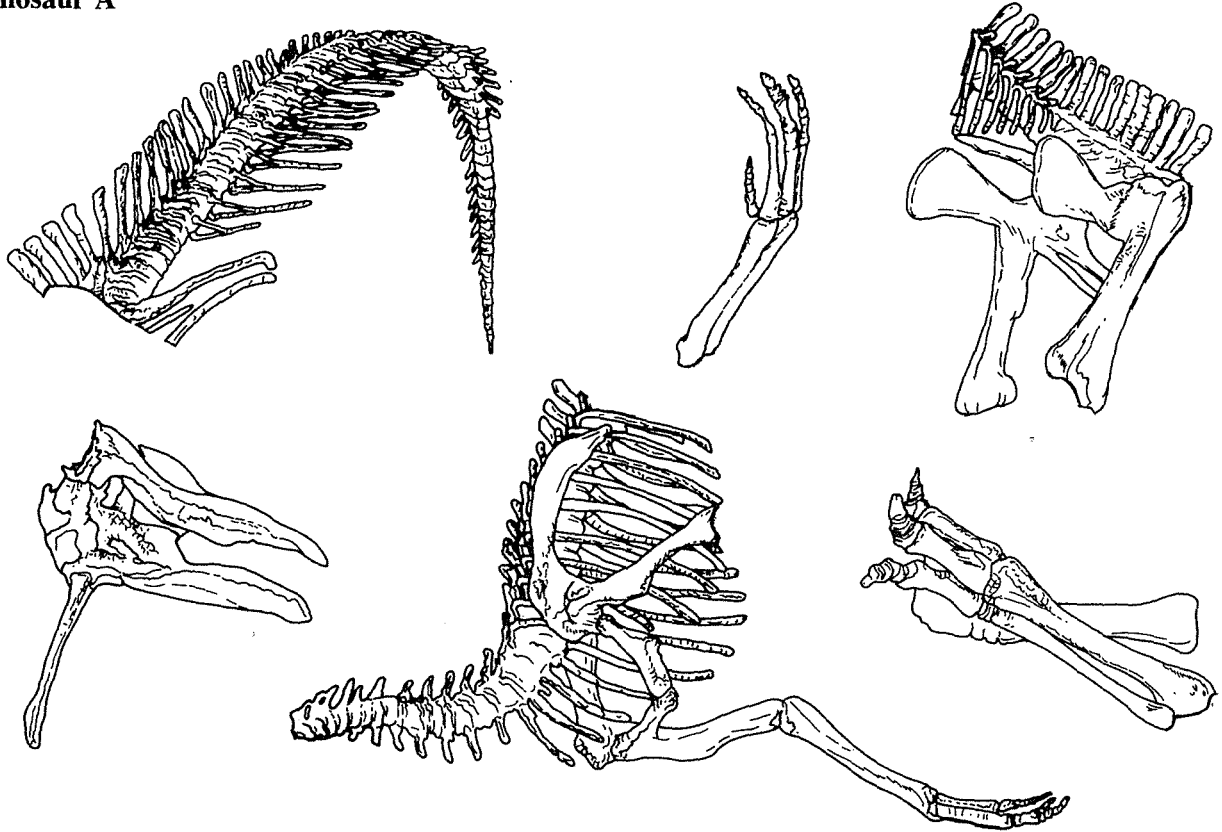


Tides

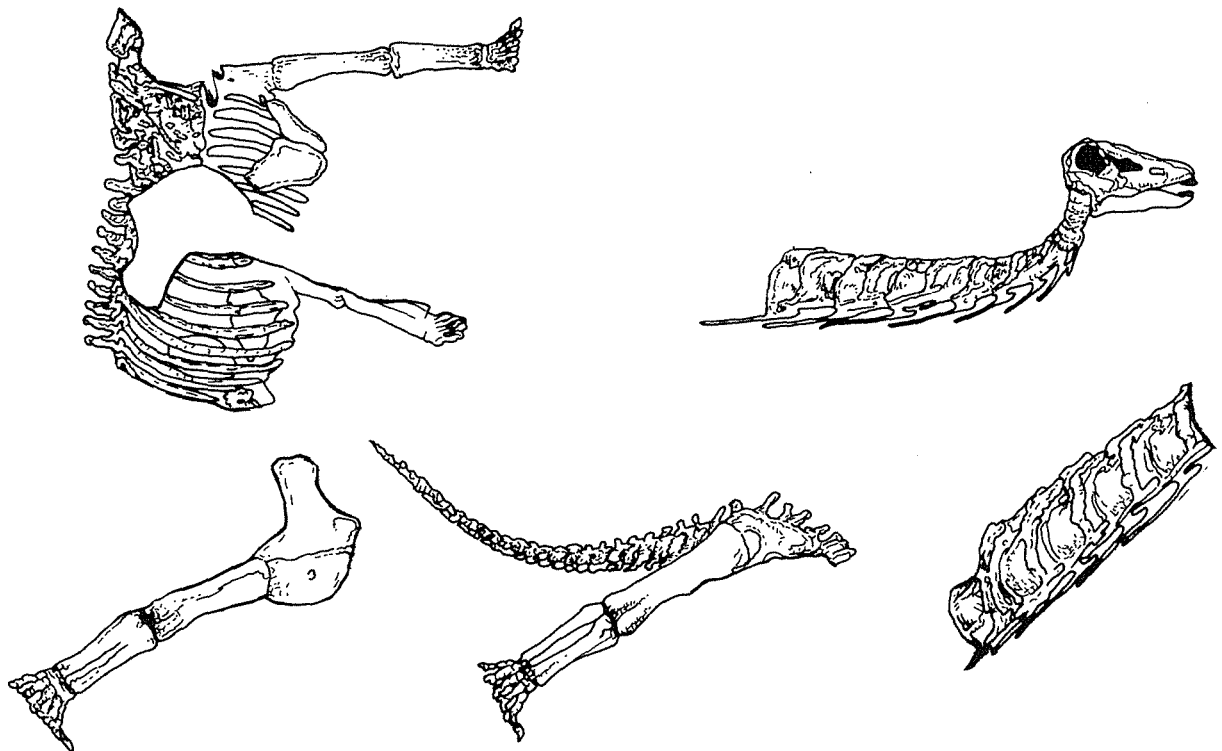


Dinosaur cut-outs

Dinosaur A



Dinosaur B



Who am I?

This creature roamed across vast areas of the Earth millions of years ago. Plot the points as they are given to reveal the creature.

Start: (2,30) (3,32) (6,32) (7,31) (7.5,30) (6,29) (5,30) (4,30) (4,25) (6,20) (9,20) (11,21) (14,24) (18,27) (21,28) (24,27) (30,22) (33,17) (36,9) (36,5) (32,1) (25,1) (22,4) (21,6) (22,5) (26,3) (30,3) (33,6) (29,14) (27,13) (24,13) Stop

Start: (27,13) (28,9) (25,9) (24,13) Stop

Start: (29,20) (16,20) (25,14) (24,13) (22,9) (19,9) (20,10) (21,13) (21,18) (23,22) Stop

Start: (21,13) (14,13) Stop

Start: (15,17) (13,14) (14,13) (14,9) (11,9) (12,10) (12,12) (11,13) (9,14) (9,18) (11,20) Stop

Start: (12,12) (11,9) (8,9) (9,10) (10,13) (9,14) (8,16) (7,17) (5,18) (2,25) (2,30) Stop

Start: (6,31) Stop

To help you find my name, here are some more clues.
Complete this sentence and use the numbered letters.
Three types of fossils are:

(a) _____ s
 ↑
 1

(b) _____ s
 ↑ ↑ ↑
 2 7 3

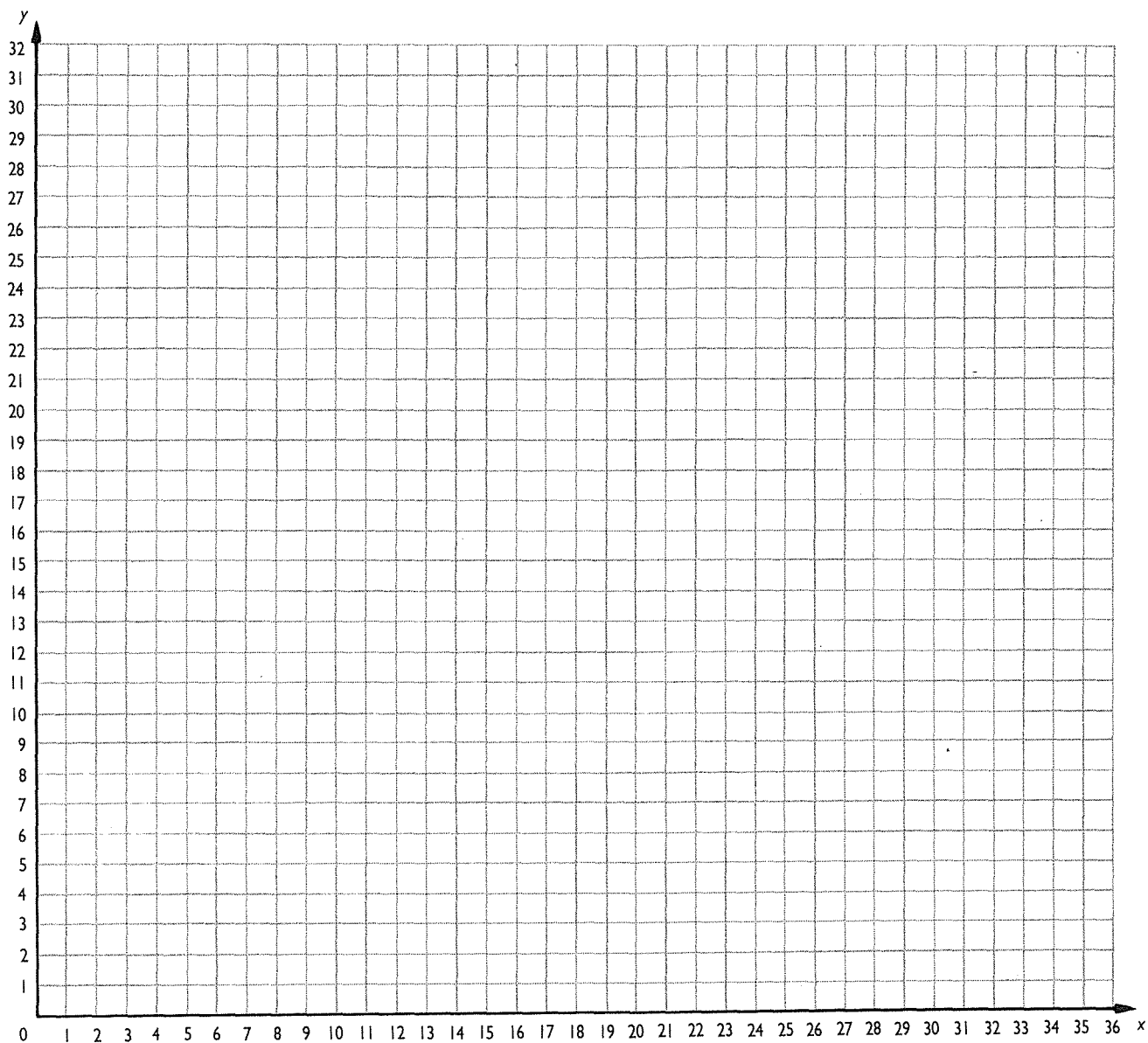
(c) _____
 ↑ ↑ ↑
 4 6 5

Answer:

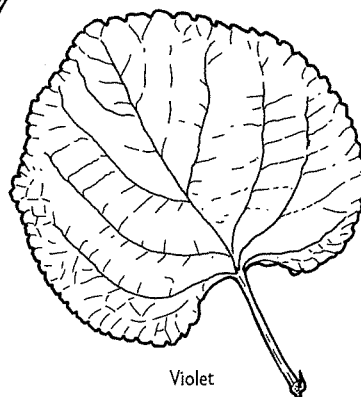
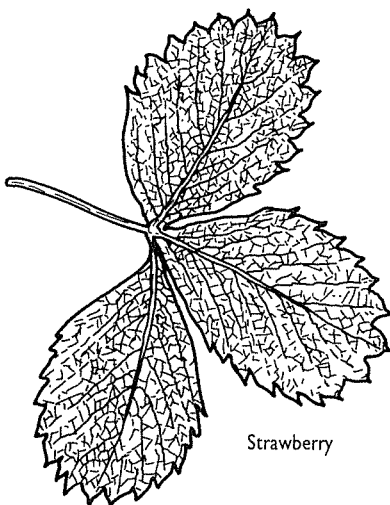
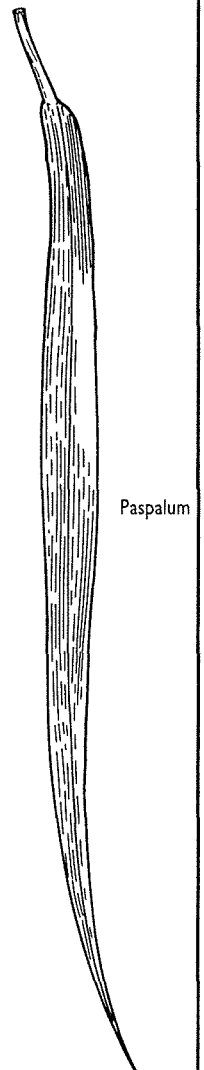
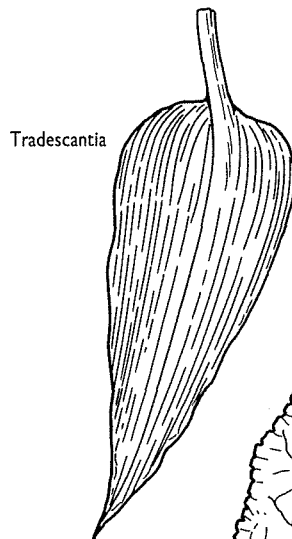
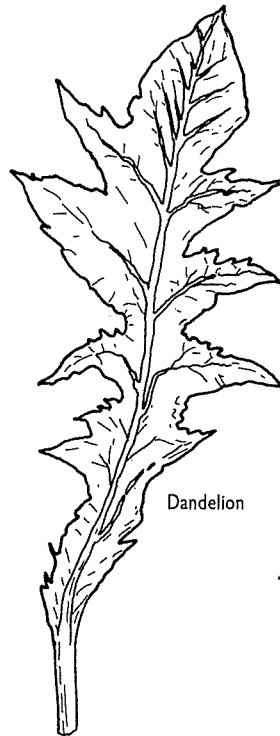
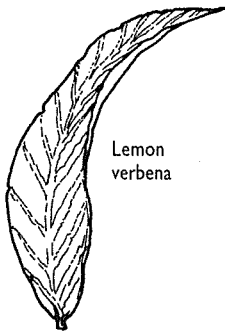
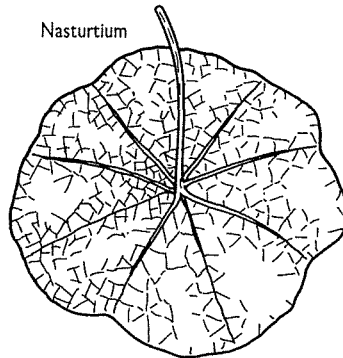
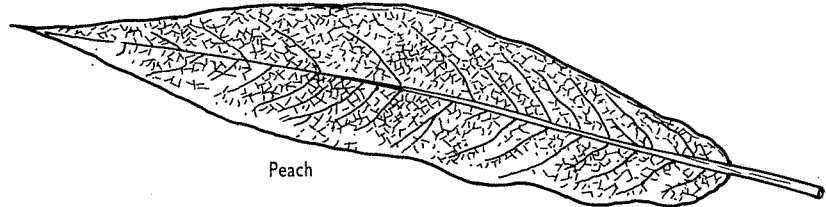
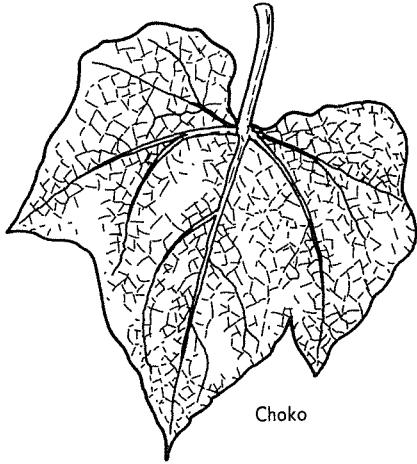
1	2	1	3	4	5	1	6	7	6	5
---	---	---	---	---	---	---	---	---	---	---

(Continued)

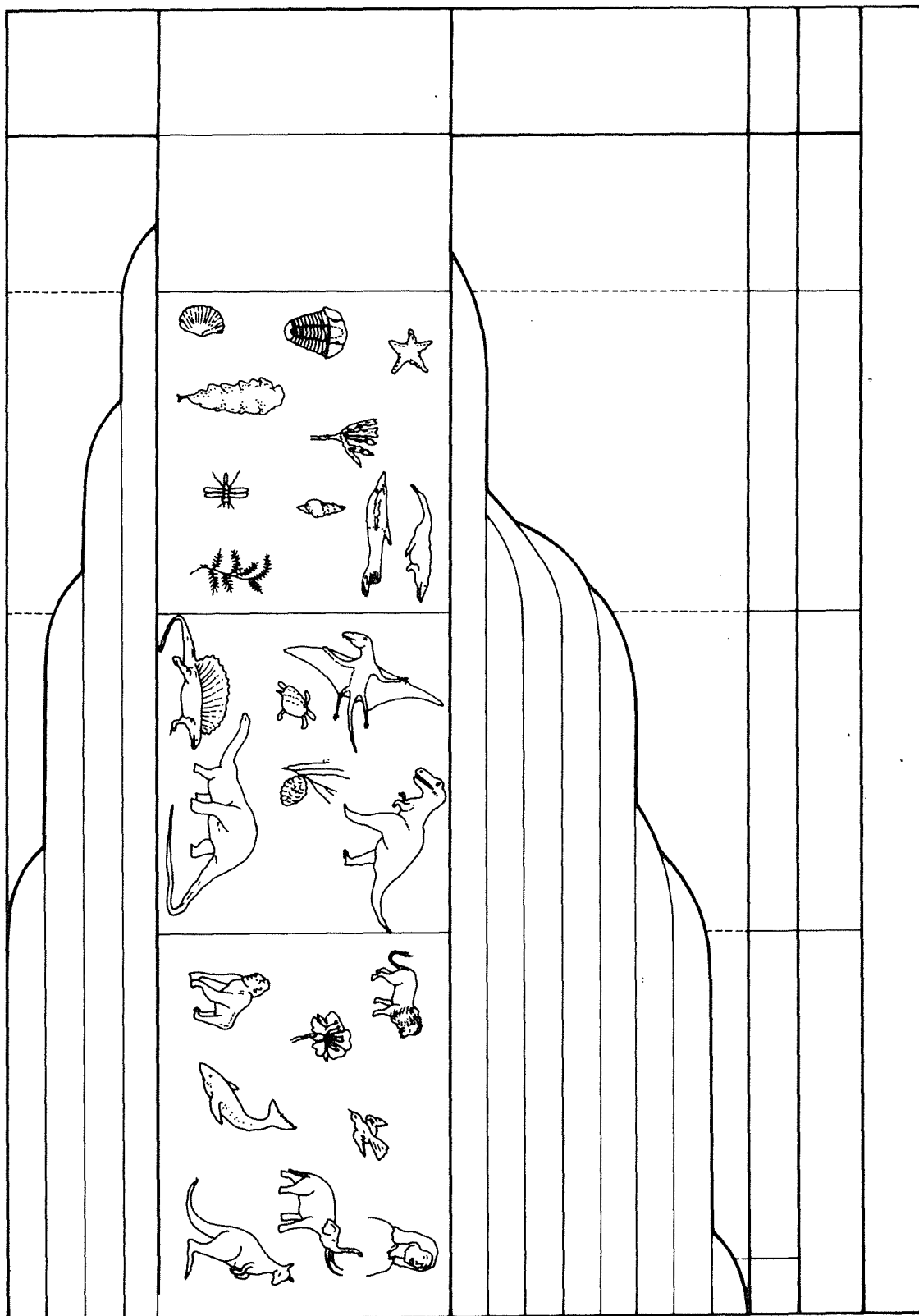
Plot the points on this grid to reveal the creature.



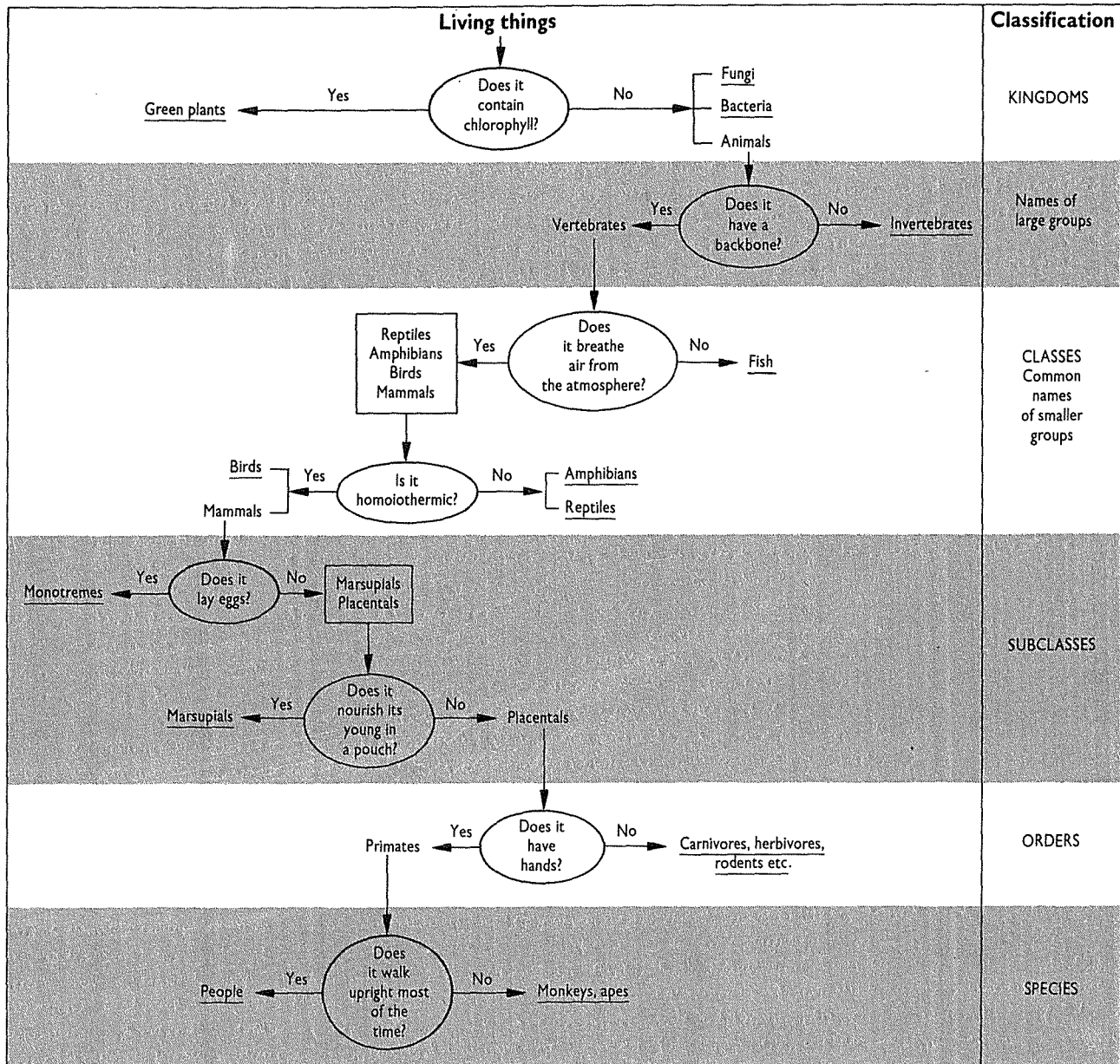
Leaf diagrams



Geological time chart



A family tree

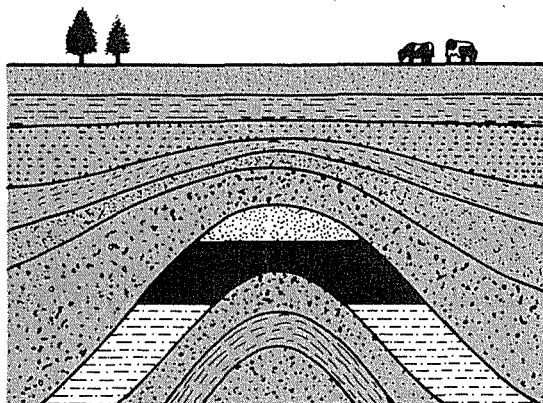


Use the family tree to answer the following questions in your notebook:

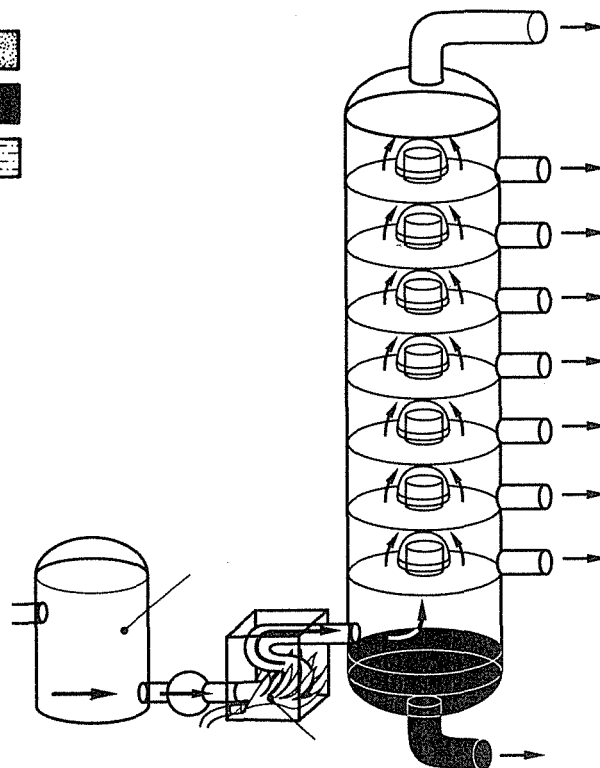
1. What types of living things do not contain chlorophyll?
2. What classes of animal belong to the group called vertebrates?
3. What are the three sub-classes of mammals?
4. What type of placentals have hands?
5. What type of primates walk upright most of the time?
6. Imagine you found a new living thing that was homoiothermic and laid eggs. To what subclass would the living thing belong?
7. Use information from the family tree to describe:
 - (a) a placental mammal
 - (b) a bird

Diagrams of location of oil and gas, distillation and sources of electricity

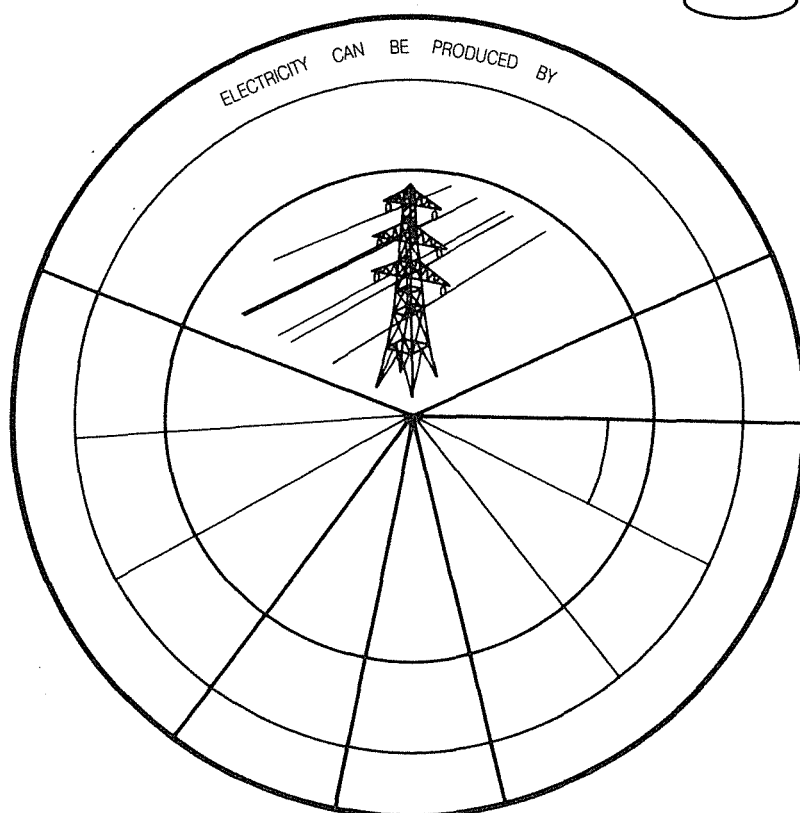
Oil and gas



Distillation

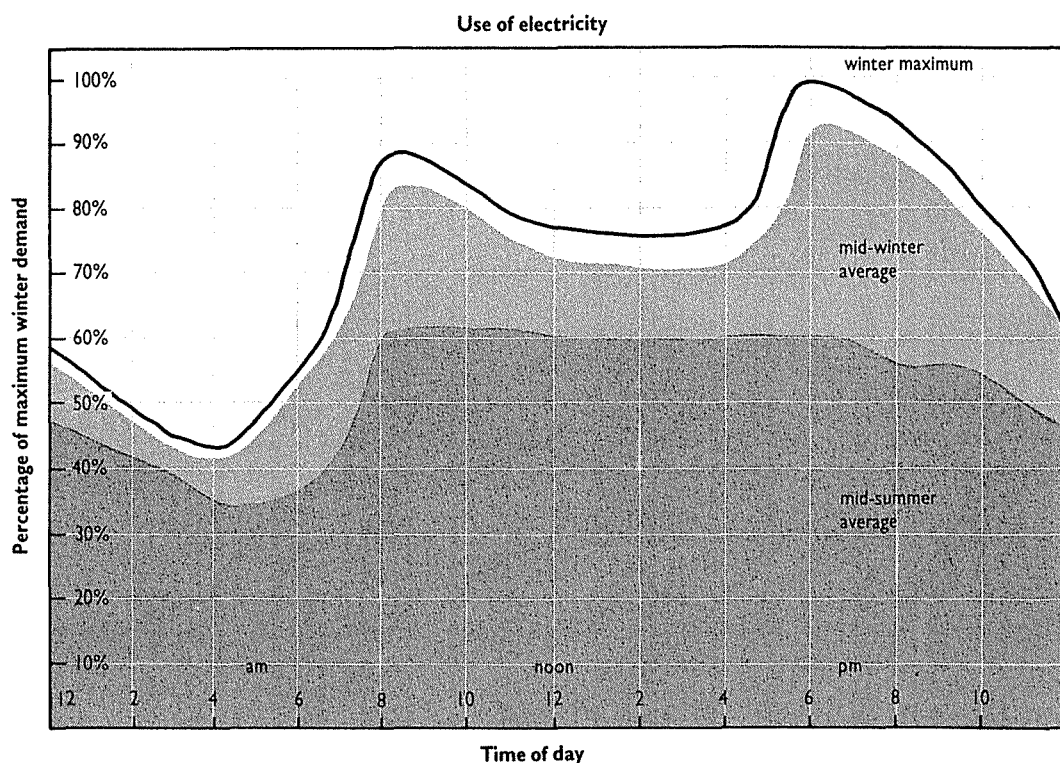


Sources of electricity



Electricity and you

This graph was obtained from Pacific Power. It gives information about electricity used in their system. The graph shows how much electricity is used throughout the day. The usage is shown as a percentage of the maximum winter demand.



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Use the graph to answer the following questions.

1. Complete the table:

<i>% of winter maximum</i>	<i>Season</i>	<i>Time of day</i>
100	_____	6.00 pm
35	_____	approx. 4.00 am
---	mid-winter	12.00 noon
---	mid-summer	12.00 noon
---	mid-summer	5.00 pm

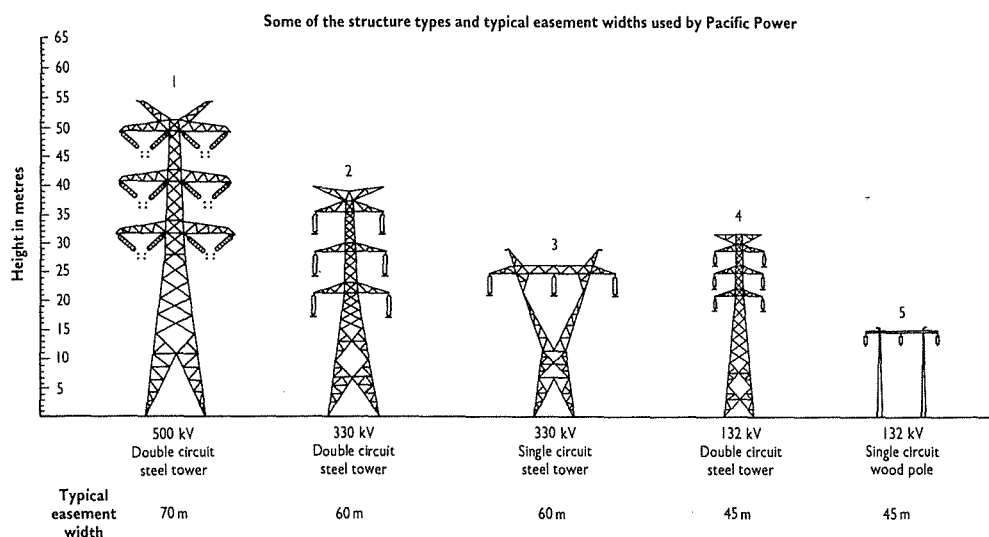
- There are two peaks for the winter maximum on the graph.
 - When do these occur?
 - Why do you think that the electricity usage would be high at these times?
- Why do you think a minimum occurs at about 4.00 am?
- More people are installing air conditioners in their homes. What do you think may happen to the mid-summer average graph during a hot summer day?
- Suggest methods of cutting down the usage of electricity, particularly in the winter time.

Structures that transport electricity

In New South Wales 99% of people use electricity that comes from power stations. Power is carried from the generating stations along thousands of kilometres of powerlines. These lines are supported by special towers.

The diagrams show the types of towers in use. Information about the height of the towers and the voltage carried by the lines is also included.

(Note: The easement is the area around the structure that must be kept clear of tall trees, buildings and so on. Easements are provided to improve safety and to allow access for electricity workers to work on the towers when necessary.)



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Questions

A. Complete the table. Remember to find the height of the tower and not the easement. The first example is done for you.

Tower number	Type of tower	Voltage carried	Height of tower
1.	Double circuit steel tower	500 kV	54 m
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

(Note: 1 kV = 1000 volts)

B. (a) What type of tower/s would you expect to see in an area where the voltage carried was 132 kV? (You may simply use the numbers 1, 2, 3, 4 or 5 as your answer.)

(b) Describe the structure that carries 500 kV.

C. Survey

Carry out a survey of the towers carrying electricity in your local area.

(a) Which structures are present?

(b) Where is your nearest substation?

If you obtain enough information, you may like to tabulate your results.

Research

Usually 240 volts is used in homes, and 12 volts is used in science laboratories in schools. Why is voltage up to 500 000 volts carried in powerlines?

Reading your electricity meter

An electricity meter records how much power is used. The amount is measured in units called kilowatt hours. An electricity meter has five dials, and they are in the same order as the numbers we use.

Dial E is 10 000 s

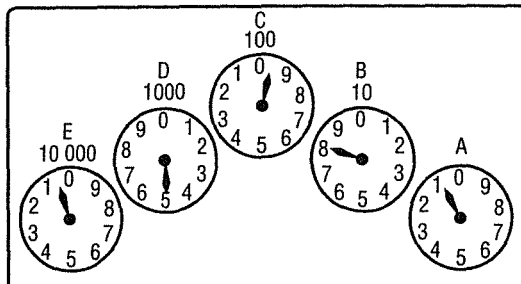
Dial D is 1 000 s

Dial C is 100 s

Dial B is 10 s

Dial A is the units

Note: Each pointer rotates in the opposite direction from the one beside it.

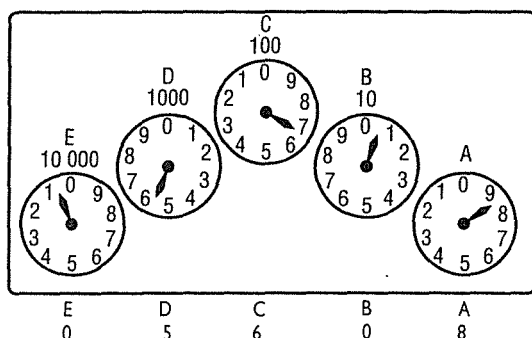


Meter reading

- Read the dials from left to right.
- If the pointer is between two numbers, write down the *lower* of the two numbers. For example:
 - (a) If the pointer is between 0 and 1, write 0.
 - (b) If the pointer is between 9 and 0, write 9. (The 0 is acting as a 10 then.)
- Take special care if one pointer is exactly *on* a number. Check the dial directly to the right of it! If that dial has not passed zero, the number has not yet been reached. In example 2, dial D is exactly on 5, but the dial beside it has not yet reached 0, and so the meter reads 4970.

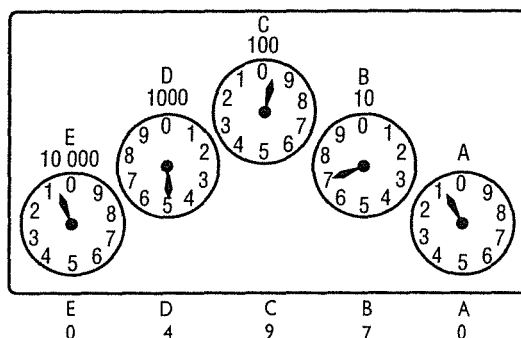
Examples: Remember to *start reading from the left*.

Example 1



The reading is 5608 kilowatt hours.

Example 2

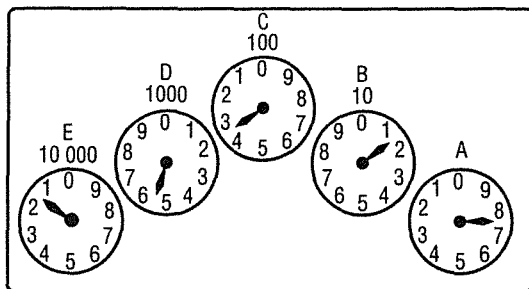


The reading is 4970 kilowatt hours.

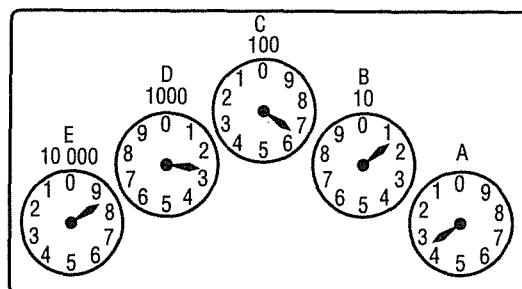
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Exercises

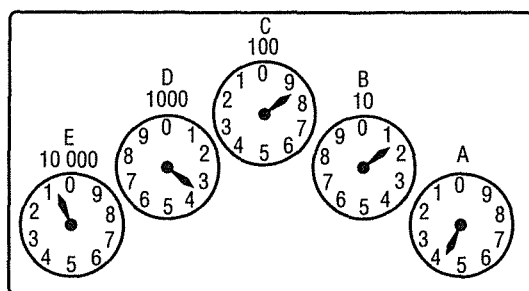
1.



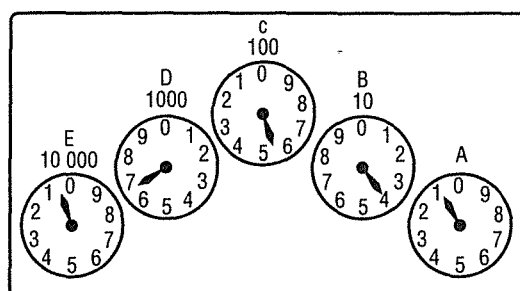
4.



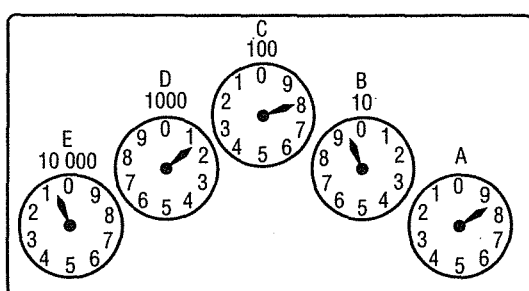
2.



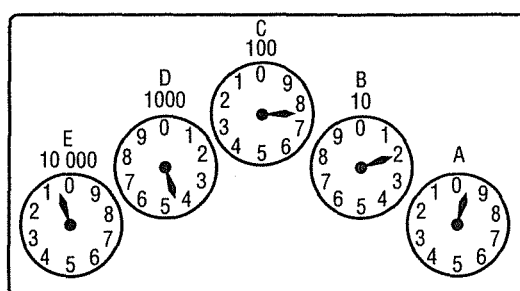
5.



3.



6.



One packaging material—glass

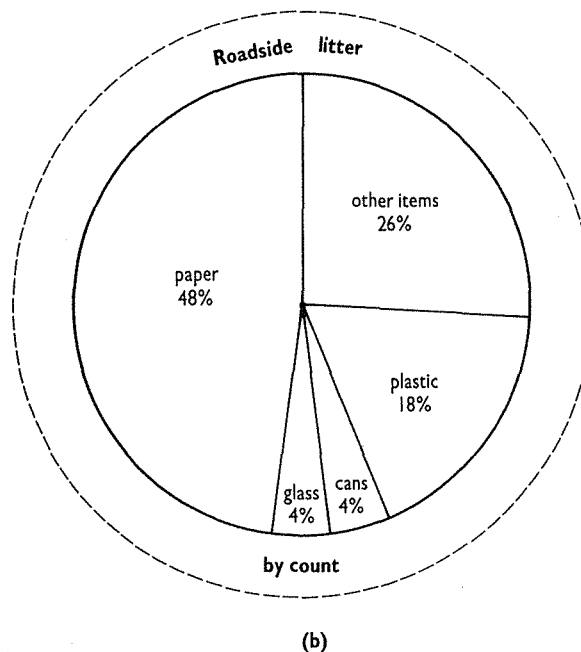
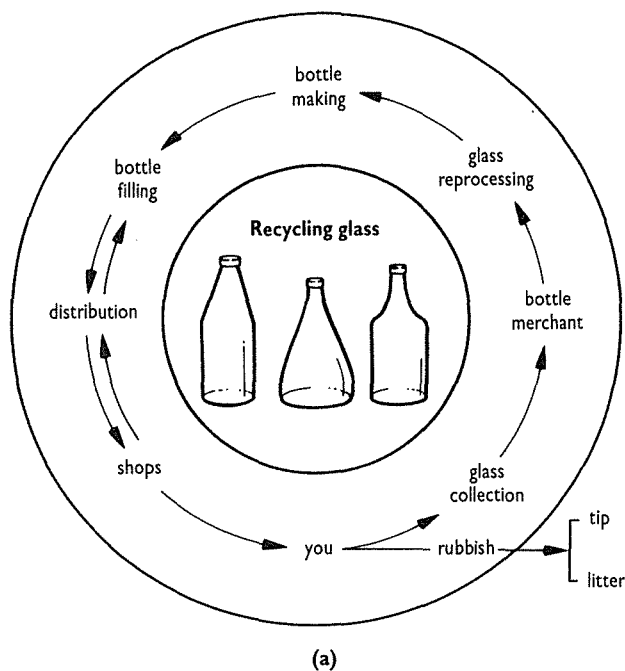


Diagram (a) shows how glass is recycled.

Diagram (b) shows the approximate percentage of roadside litter, by count.

Use the diagrams to answer the following questions:

1. List the steps that occur when you hand in glass for recycling. The old glass goes to the bottle merchant...

2. There are arrows going both ways in one part of the recycling diagram. What type of glass would be involved?

3. Where does non-recycled glass end up?

4. What is the most common type of litter found beside the road?

5. What percentage of litter is:

(a) glass? _____ (b) cans? _____ (c) plastic? _____

Research

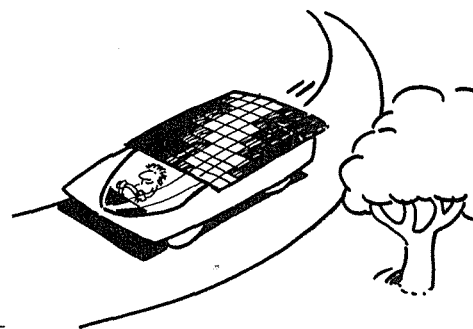
Find out how glass is made, and how old glass is included in the glass-making process.

Did you know?

Up to 40 tonnes of recycled glass is included in every 100 tonnes of new glass in Australia.

The 1991 energy challenge

<i>Vehicle</i>	<i>Energy source</i>	<i>GGI</i>	<i>Average speed (km/h)</i>	<i>Fuel consumption</i>
Mitsubishi Canter	CNG	26	46.7	13.4 kg/100 km
Daihatsu Charade	Diesel	79	37.0	2.3 L/100 km
Daihatsu Mira	ULP	91	46.1	4.8 L/100 km
Ford Cortina	Hydrogen	116	35.7	1.7 kg/100 km
City Car	Electric	119	28.3	10.9 kWh/100 km
Daihatsu Charade	LPG	120	46.1	5.9 L/100 km
BMW Isetta	Super petrol	121	43.4	4.6 L/100 km
Zeta Sport	Petrol/oil	146	43.4	7.1 L/100 km
Solar Star	Solar	0	50.5	0
Rebel Cycles	Human	0	21.3	0
Rover	Ethanol/Petrol	84	46.4	6.7 L/100 km
Stanley Steamer	Kerosene	227	36.1	33.4 L/100km



Note: GGI means the Greenhouse Gas Index—the lower the index, the less is the harm done to the atmosphere
 CNG means compressed natural gas
 ULP means unleaded petrol
 LPG means liquid petroleum gas

Source: Results are courtesy of the National Roads & Motorists Association (NRMA)

Answer the following questions in your notebook:

- Which vehicle produced the highest GGI (Greenhouse Gas Index)?
- Which vehicle or vehicles produced the lowest GGI?
- Which vehicle produced:
 - the highest average speed?
 - the lowest average speed?
- Which vehicles used liquid fuels?

Hint: Their fuel will be measured in litres (L)

 - Which of the vehicles in (a) used:
 - the most fuel per 100 km?
 - the least fuel per 100 km?
 - Which fuel was used by the vehicle in:
 - ?
 - ?
- Which vehicles would cause the least damage to the atmosphere?
 - Why are these vehicles not used by many people?
- Which fuel do you think Australians should be using? Write a page explaining your choice. Use the back of this sheet or your notebook.

Research

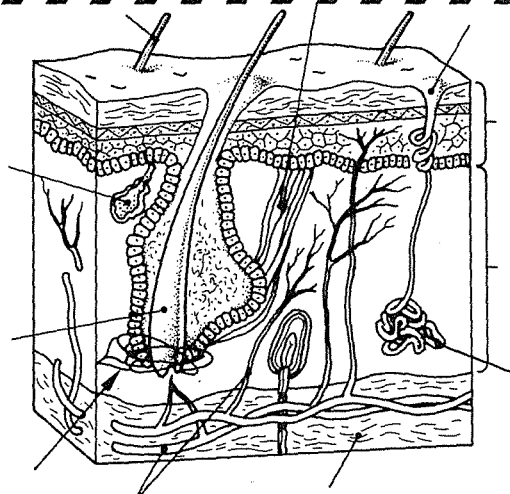
Use magazines, or contact a vehicle manufacturer, to find out the fuel consumption of your favourite car.

Did you know?

The first solar-powered car was registered for use on Australian roads in November 1991. Before this time, solar cars were used only in competitions.

Saving your skin

A. Cut out and label the diagram of the skin.



B. Read the passage below and answer the following questions in your notebook.

MELANIN is the PIGMENT or colour present in skin and hair. Darker coloured skin contains more melanin than lighter coloured skin. The function of melanin is to absorb harmful RADIATION from the Sun. The pigment changes colour to protect the skin.

Fair-skinned people with a lot of melanin in their skins tan more easily. When melanin is uneven in the skin, freckles develop.

Australians with fair skin have the highest rate of skin CANCER in the world because they spend too long in the sun. To cut down the chances of skin cancer there are four things that people can do:

1. Stay out of the sun.
2. Reduce the amount of dangerous radiation on your skin by 50% each day by staying out of the sun between 11 am and 1 pm (daylight saving time).
3. Wear a hat and use other clothing to cover your skin.
4. Use SUNSCREENS on your skin.

Sunscreens have a SUN PROTECTION FACTOR (SPF) listed on their labels. The SPF varies from 4 to 15+. You can work out how long you can safely stay in the sun using the SPF. Simply multiply the SPF by twelve and a half minutes. Twelve and a half minutes is the time that average fair skin takes to go slightly red in the Australian midday sun.

SPF	Time you should be safe in the sun
4	$4 \times 12\frac{1}{2} = 50$ minutes
10	$10 \times 12\frac{1}{2} = 125$ minutes

Remember:

1. Sunscreens must be reapplied regularly as they may get rubbed or washed off.
2. Times given are a guide only. Some people burn much more quickly.

Questions

1. Find the meanings of all the words in capital letters.
2. What is the function of melanin?
3. Which country has the highest rate of skin cancer in the world?
4. What causes skin cancer?
5. There are four ways to protect your skin listed in the passage. Which way do you think is the best? Why?

6. How long would you be safe in the sun, if you had applied a sunscreen with a SPF of:
 - (a) 12?
 - (b) 15?

Extra activity

Design a poster to encourage people to take care in the sun. Remember that some scientists now say there is more dangerous radiation coming from the Sun, because there is less ozone in the atmosphere.

Graphical exercise and crossword: The growth of a baby

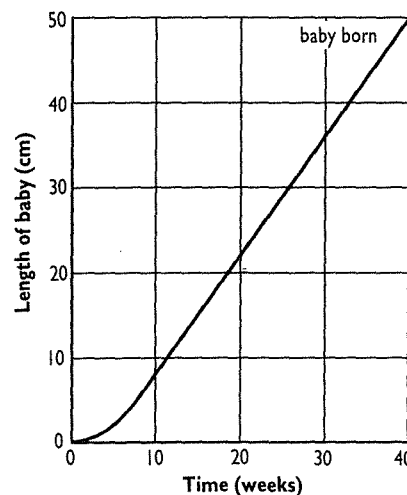
Ultrasounds are beams of high-frequency sound that we are unable to hear. Using these beams of sound, doctors are able to study the baby as it grows inside the mother. (The ultrasound does no harm to mother or baby.)

Results of ultrasounds for a typical baby growing in the uterus are given in the graph below. Use the graph to answer the questions.

- What is the baby's approximate 'age' if the ultrasound shows the baby to be the following lengths?

- 10 cm _____
- 20 cm _____
- 30 cm _____
- 40 cm _____
- 50 cm _____

- If the baby is 30 cm long on 1 June, when is the baby likely to be born? (Assume the baby is born at 40 weeks.) _____



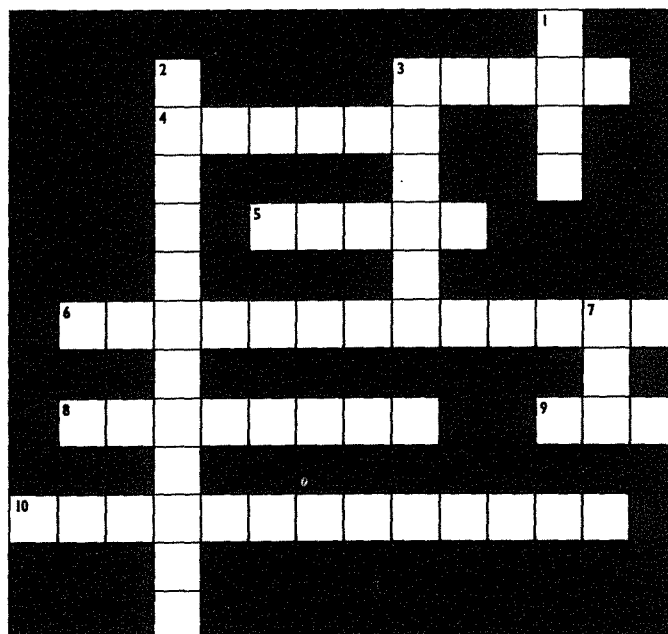
Crossword

Across

- Liquid that cushions the baby
- The baby is called this name before it has developed human features
- The process that occurs usually about forty weeks after conception
- The process of the sperm and ovum joining together
- Another name for the afterbirth
- The bag in which the baby grows
- The lifeline between the baby and the mother (two words)

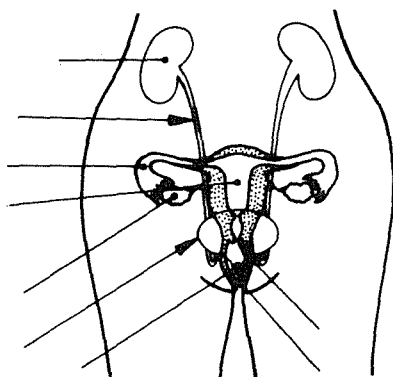
Down

- The number of months that the average baby is inside the mother
- This process stops when a woman becomes pregnant
- The baby is called this name when it has developed human features
- Another name for female eggs

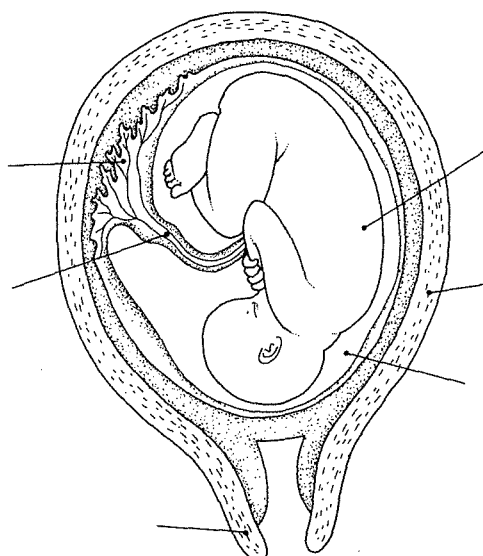
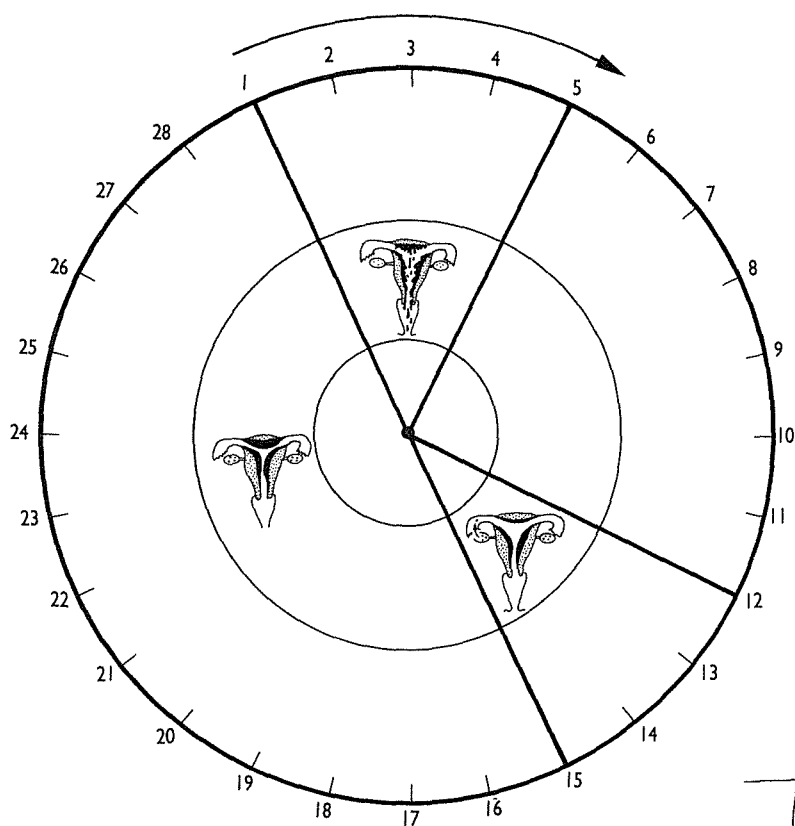
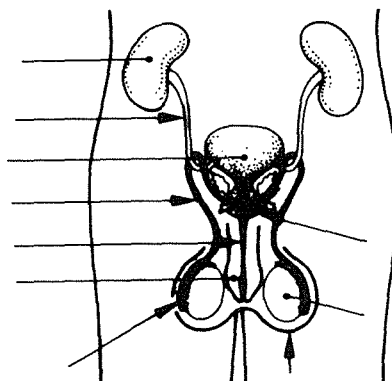


Diagrams of the female and male reproductive systems, menstrual cycle and baby in uterus

Front view



Front view



What's that gas?

There are types of gases being pumped into the atmosphere that scientists believe are causing a lot of harm. Solve this puzzle to find out what types of gases they are.

1. Join the clue to its correct chemical symbol.
 2. The letter it passes through will help you to crack the code.
- You may use Chapter 6 of *Dynamic Science Book 2* to help.



1. An acid found in rain in Kakadu, NT • (R) (I) • S
2. A solid, called brimstone in ancient times, that may come from an erupting volcano • (H) (L) • N₂
3. A gas that may form sulfurous acid when dissolved in water • (M) (C) (A) • O₂
4. The main gas present in air • (O) (N) • HCOOH (formic acid)
5. The gas that usually causes rain to be acidic • (E) (L) (U) • NH₃ (ammonia)
6. The gas present in liquid animal wastes • (W) (C) (F) • SO₃ (sulfur trioxide)
7. The gas essential for life • (D) (B) (R) • CO₂
8. The main substance in acid rain • (A) (O) (E) • CH₄
9. Main gas in natural gas • (G) (N) • H₂O
10. Dust particles present in wood and coal fires • (O) (S) (L) • NO₂ (nitrogen dioxide)
11. One compound produced by lightning in the atmosphere • (S) (H) (N) • C

1	2	3	4	5	4	6	3	7	4	5	4	1	8	5	9	4	10	11
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	----	----

Indicating acids and alkalis

Hanna and Jean-Paul had made up a number of mixtures to act as indicators of acids and alkalis. They had:

1. taken different parts of plants;
2. crushed them with a mortar and pestle; and
3. extracted dyes from the plants by soaking the crushed plant parts in a small amount of methylated spirits.

The results of their experiments are given in the following table:

Plant part	Colour of dye		
	In diluted methylated spirit	In acid solution	In alkali solution
Petals			
Red hibiscus	Pink	Orange	Blue-green
Red oleander	Mauve	Pink	Green
Red rose	Pink	Pink	Olive-green
Red canna	Red	Orange	Dark-green
Red geranium	Red	Orange	Yellow
Red dahlia	Red	Orange-red	Amber
Mauve impatiens	Mauve	Pink	Green
Purple lasiandra	Purple	Pink	Blue
Purple aster	Purple	Pink	Green
Yellow marigold	Yellow	Yellow	Yellow
Yellow dandelion	Yellow	Yellow	Yellow
Orange nasturtium	Orange	Yellow	Yellow
White rose	Colourless	Colourless	Amber
White daisy	Colourless	Colourless	Yellow
Other parts			
Red cabbage leaf	Purple	Pink	Green
Raw beetroot	Red	Red	Yellow
Green spinach leaf	Green	Yellow-green	Yellow-green

Use the table and other information to answer the following questions:

1. What makes a substance a good indicator? (You may have to discuss this question with your teacher before completing the sheet.) _____
2. Which plant parts were not good indicators? _____
3. What colour would the following indicators be in acid solution?
 (a) red geranium _____ (b) mauve impatiens _____ (c) white rose _____
4. What colour would the following indicators be in alkali solution?
 (a) raw beetroot _____ (b) red cabbage leaf _____

Did you know?

Some plant petals are natural indicators of soil pH. Hydrangeas may be pink, blue or mauve, depending upon the pH of the soil in which they are grown.

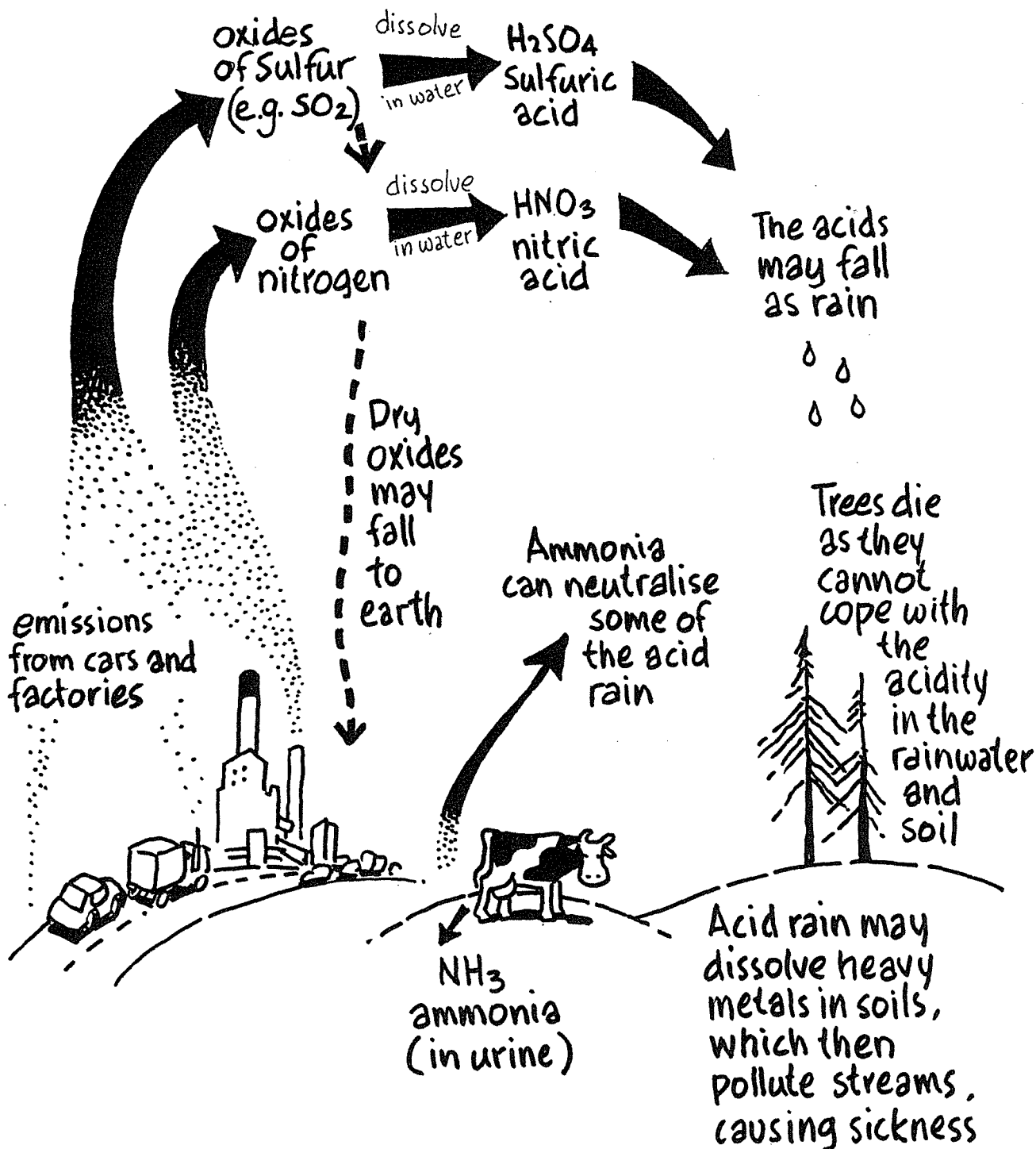
Research: Find out which type of soil gives which coloured hydrangeas.

Acid rain

What do the marble of the Parthenon in Greece, the surface of the Taj Mahal in India and the Black Forest in Germany all have in common? They are all being destroyed by acid rain.

Rain is normally a little acidic. However, since the Industrial Revolution large amounts of fossil fuels have been burnt causing severe pollution in some areas.

The diagram shows a simplified version of the production of acid rain.



(Continued)

Use the diagram to help you to answer the following questions:

1. Complete the following table using the correct chemical symbols for the substances:

Substance	Chemical symbol
(a) sulfur dioxide	
(b) nitric acid	
(c) sulfuric acid	
(d) ammonia	

2. What types of nasty oxides come from factories and cars?

3. What two things may happen to these oxides?

4. Give two examples of things that may happen when acid rain falls.

(a) _____

(b) _____

5. (a) What substance is able to neutralise some of the acid rain? _____

(b) Where does this substance come from?

Research



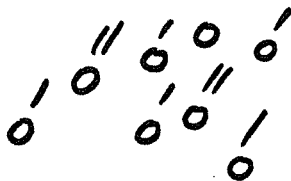

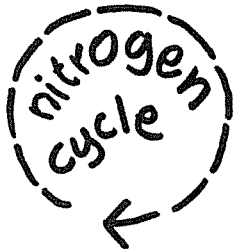
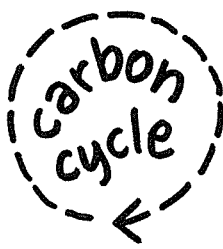

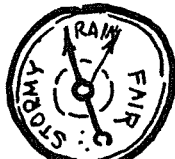
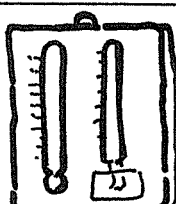
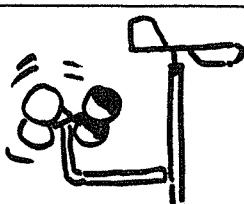
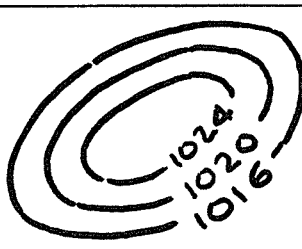
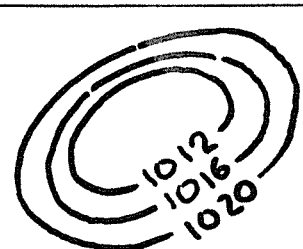
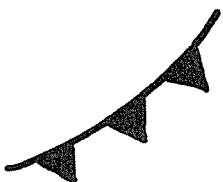



Use Chapter 6 in *Dynamic Science Book 2* to find out the natural causes of acid rain. Write about half a page on these causes.

Bingo clues: Changes in the Earth's atmosphere

Pure water has this pH (7)	Strong acid has this pH (1)	Strong alkali has this pH (14)	Acid rain may have this pH (5)
Gas found in nature that causes rain water to be slightly acidic (CO ₂ —carbon dioxide)	Gas formed when remains of living things decay (CH ₄ —natural gas)	Main gas present in air (N ₂ —nitrogen)	Gas capable of neutralising acid rain; the gas comes from animal urine (NH ₃ —ammonia)
Winds that bring wet seasons to tropical regions of Earth. (monsoons)	Rain, hail, sleet and snow are all examples of this (precipitation)	Precipitation, where balls of ice fall to the ground (hail)	Nature's worst storms, where spirals of thunderstorms occur (cyclones)
Natural cycle in which bacteria may use ammonia to produce nitrates (nitrogen cycle)	Natural cycle in which respiration returns carbon dioxide to the air (carbon cycle)	Small droplets of water in the atmosphere may cause this to occur (rainbow)	Instrument used for measuring air pressure (barometer)
Instrument used to obtain readings for humidity measurements (hygrometer)	Instrument used to measure wind speed and direction (anemometer)	High pressure system (diagram reading from outside to inside: 1016, 1020, 1024)	Low pressure system (diagram reading from outside to inside: 1020, 1016, 1012)
Cold front (line with arrowheads attached)	Warm front (line with semicircles attached)	Wind speed that is between 33 km/h and 41 km/h (line with two strokes)	Wind speed that is between 14 km/h and 23 km/h (line with one stroke)

Answers are in brackets in italics. Do not read them out.

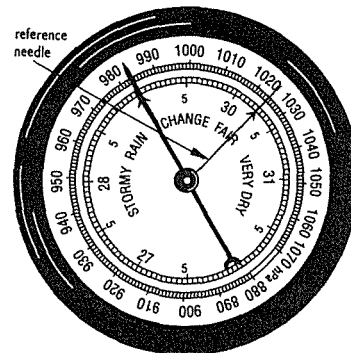
Bingo clues: Changes in the Earth's atmosphere

7	1	14	5
CO ₂ carbon dioxide	CH ₄ natural gas	N ₂ nitrogen	NH ₃ ammonia
 monsoons	 precipitation	 hail	 cyclones
 nitrogen cycle	 carbon cycle	 rainbow	 barometer
 hygrometer	 anemometer		
			

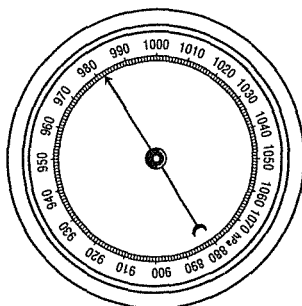
Reading barometers

Pressure is measured using an aneroid barometer. Pressure is measured in hectopascals (hPa). Many barometers have a reference needle that can be lined up with the barometric needle. The observer can then easily see how the pressure has changed, when he/she returns the next day.

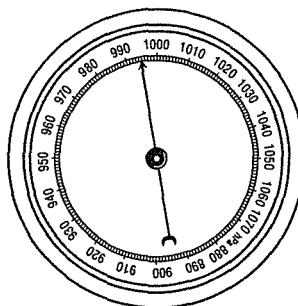
1. Look closely at the diagrams and estimate the barometric readings:



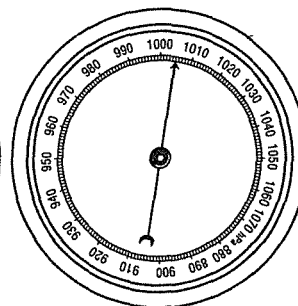
Reading: 983 hPa



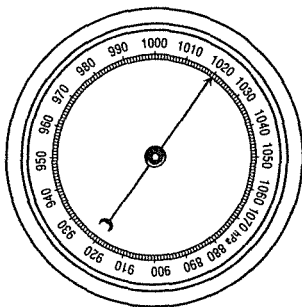
(a)



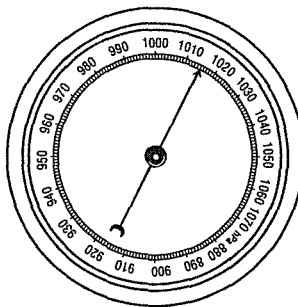
(b)



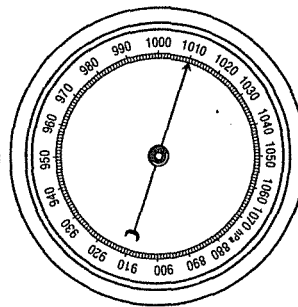
(c)



(d)



(e)



(f)

2. Use the diagram in the top right-hand corner to help answer the following questions. Imagine the following situations happen, and predict the change in the weather that may occur.

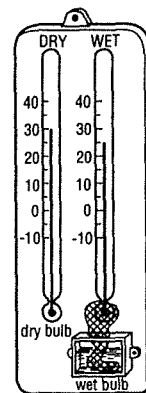
(a) The air pressure suddenly drops from 1010 hPa to 980 hPa.

(b) The air pressure gradually changes from 1000 hPa to 1026 hPa.

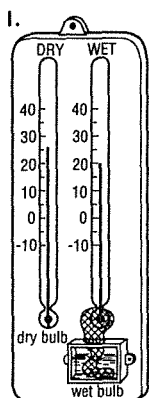
3. Would you expect the barometric reading to change (increase or decrease) if a sunny dry day developed storms? If so, how?

Working out relative humidity

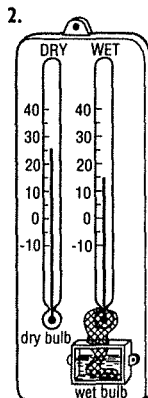
Dry bulb (°C)	Difference between wet and dry bulb readings (°C)																				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0	100	82	65	48	31																
2	100	84	68	52	37	22															
4	100	85	70	56	42	29															
6	100	86	73	60	47	35	23														
8	100	87	75	63	51	40	29	18													
10	100	88	76	65	54	44	34	24	14												
12	100	89	78	68	57	48	38	29	20												
14	100	90	79	70	60	51	42	33	25	17											
16	100	90	81	71	63	54	46	37	30	22	15										
18	100	91	82	73	65	56	49	41	34	27	20										
20	100	91	83	74	66	59	51	44	37	30	24	18									
22	100	92	84	76	68	61	54	47	40	34	28	22	16								
24	100	92	84	77	70	63	56	49	43	37	31	26	20	15							
26	100	92	85	78	71	64	58	52	46	40	34	29	24	19	14						
28	100	93	85	78	72	65	59	53	48	42	37	32	27	22	18						
30	100	93	86	79	73	67	61	55	50	44	39	34	30	25	21	17					
32	100	93	86	80	74	68	62	57	51	46	41	37	32	28	24	20	16				
34	100	94	87	81	75	69	64	58	53	48	43	39	34	30	26	22	19	15			
36	100	94	87	81	76	70	65	60	55	50	45	41	37	32	29	25	21	18	14		
38	100	94	88	82	76	71	66	61	56	51	47	43	39	35	31	27	24	20	17	14	
40	100	94	88	82	77	72	67	62	57	53	48	44	40	37	33	29	26	23	20	17	14



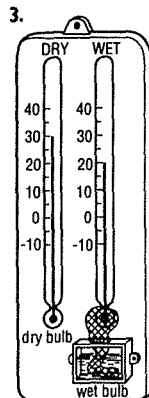
Example
 Dry bulb = 30°C
 Wet bulb = 25°C
 Difference = 5°C
 From chart 67% humidity



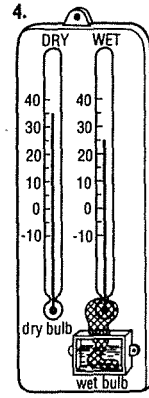
1. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



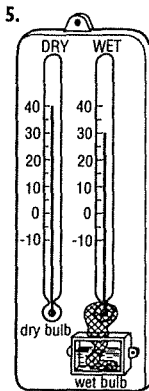
2. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



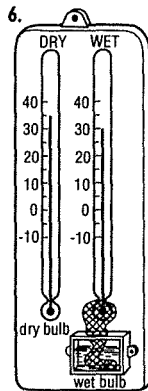
3. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



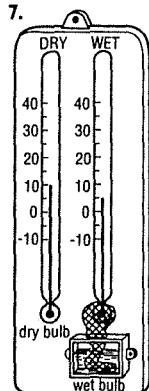
4. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



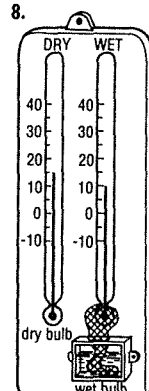
5. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



6. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



7. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____



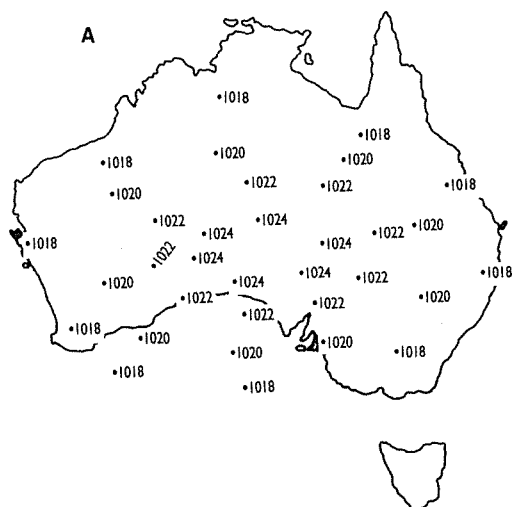
8. Dry bulb = 26 °C
 Wet bulb = 20 °C
 Difference = 6 °C
 % humidity _____

How does a meteorologist draw a weather map?

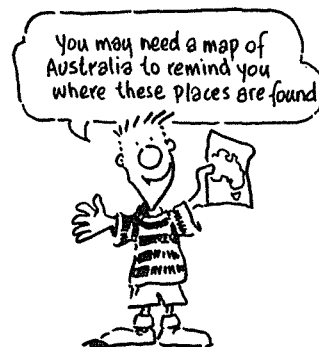
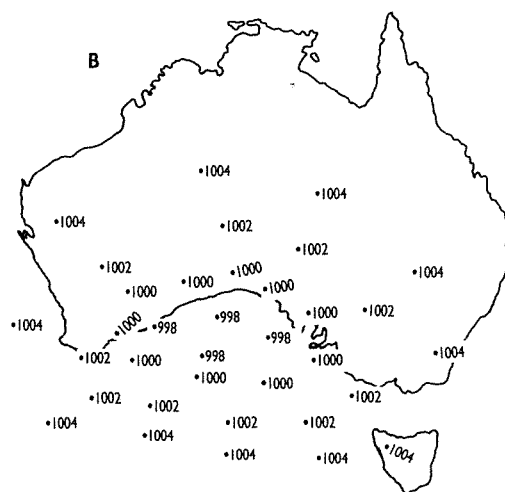
Exercise

Complete weather maps A and B by doing the following:

- On each of the maps:
 - join the points with equal air pressure; and
 - label each system as either a high or a low pressure system.



Symbols		
ISOBARS — 1016 — (Values in hectopascals)	WINDS (km/h)	RAINFALL
COLD FRONT	CALM ☉ 24-32	
WARM FRONT	1-4 33-41	
TROUGH	5-13 42-51	
	14-23 52-60	



- To weather map A add the following features:
 - rainfall over southern Tasmania and Cape York (Queensland);
 - a cold front, almost parallel with the coastline, just west of Perth (Western Australia);
 - a westerly wind of 20 km/h parallel to the coastline, south of Melbourne (Victoria);
 - a southerly wind of 30 km/h at Sydney (New South Wales).
- To weather map B add the following features:
 - rainfall over Arnhem Land (Northern Territory), Brisbane (Queensland) and Adelaide (South Australia);
 - a cold front parallel to the outermost isobar, through Sydney (New South Wales).



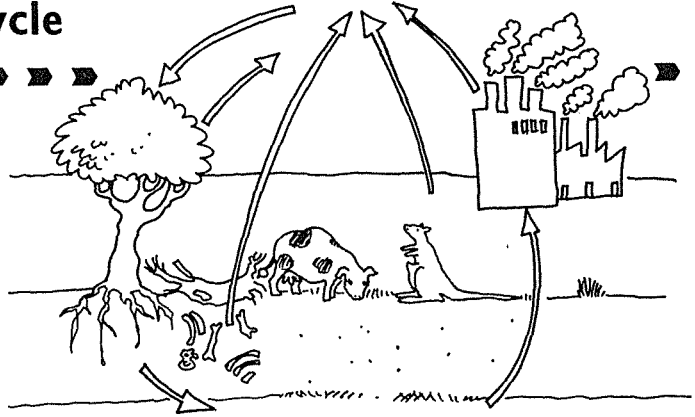
Activity

Collect weather maps for at least three successive days.

- How many of the symbols can you identify?
- Can you see any patterns in the way that the pressure systems move? (Do the systems move from north to south, east to west, ...?)
- Can you predict how the next day's weather map may look? Draw it. Check the next day's weather map to see how good a forecaster you really are.

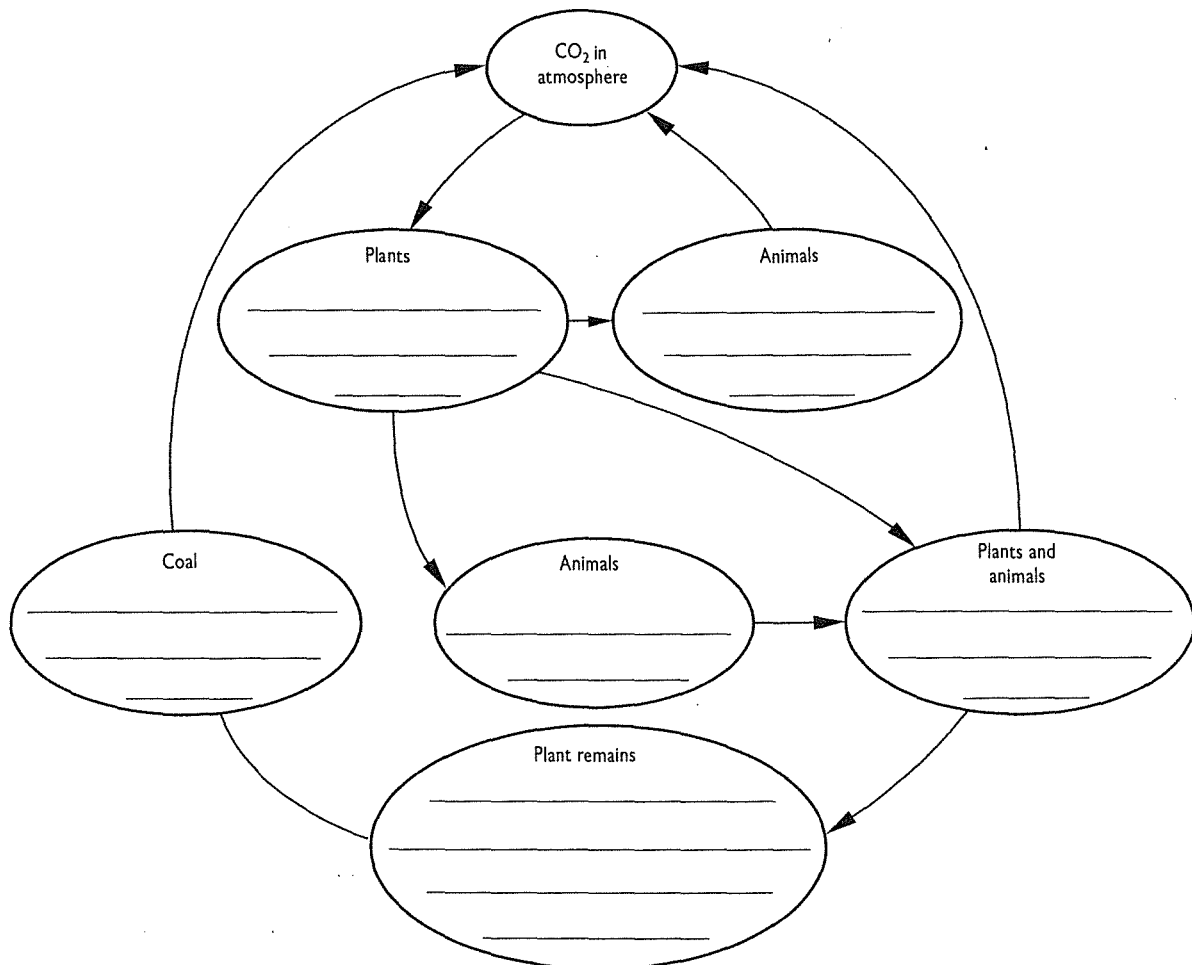
The carbon cycle

1. Label the diagram of the carbon cycle.



2. Use the groups of words in the box to complete the flow chart below.

- use CO_2 in photosynthesis to produce O_2
- die and CO_2 is given off
- use O_2 and breathe out CO_2
- eat plants
- may be burnt releasing CO_2
- may become buried and over millions of years change to coal



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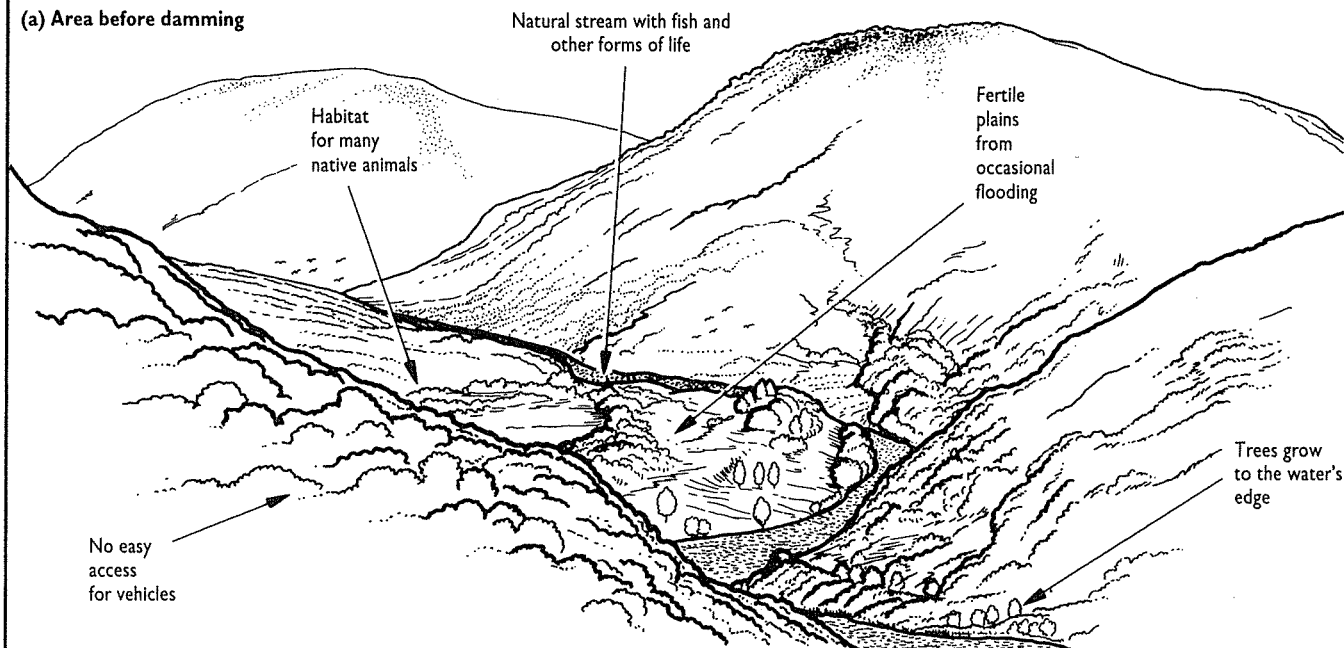
Dams and their impact

People build dams to:

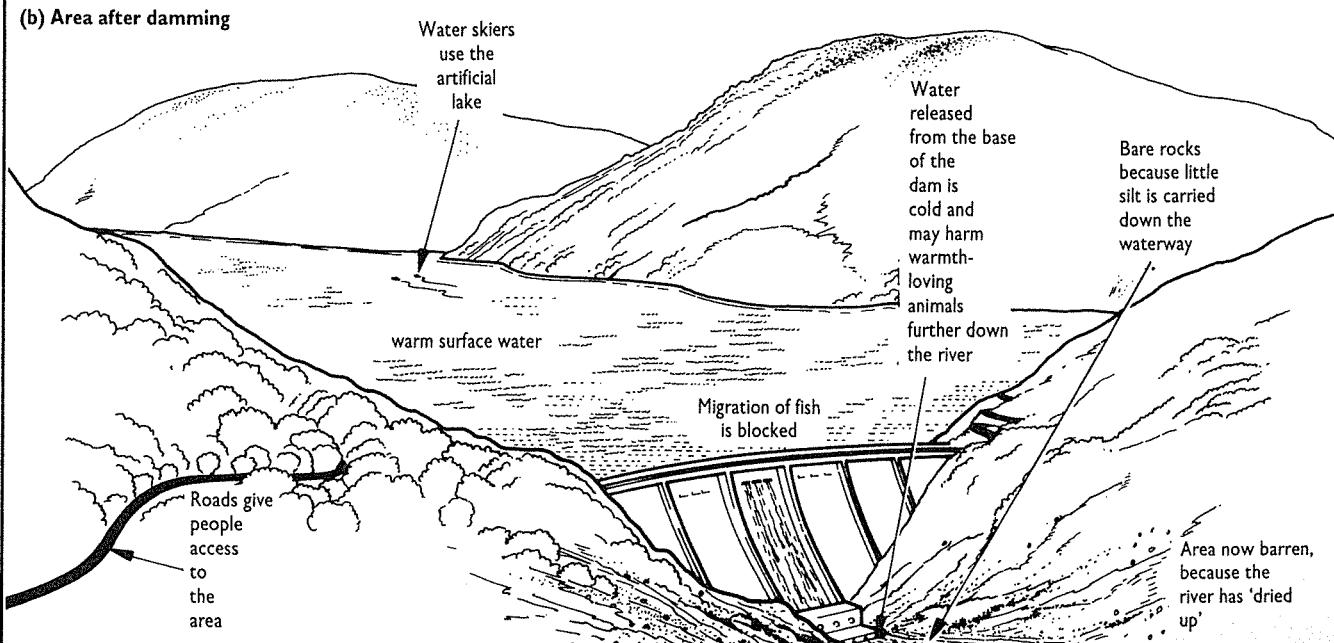
1. ensure adequate water supplies;
2. irrigate farmlands;
3. drive hydroelectric turbines to produce electricity.

What effect do dams have on the environment? Look at the two scenes.

(a) Area before damming



(b) Area after damming



(Continued)

Questions

1. In the table, list the good and bad features related to the dam and its effects.

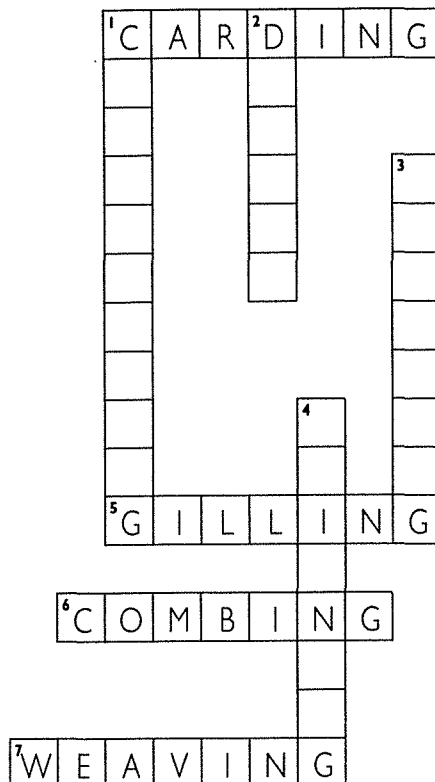
<i>Good features</i>	<i>Bad features</i>

2. Organise a class debate with the topic: 'Should a dam be built in... (a rainforest, a wilderness area... your choice...)?'

Barrier crossword: Processing wool

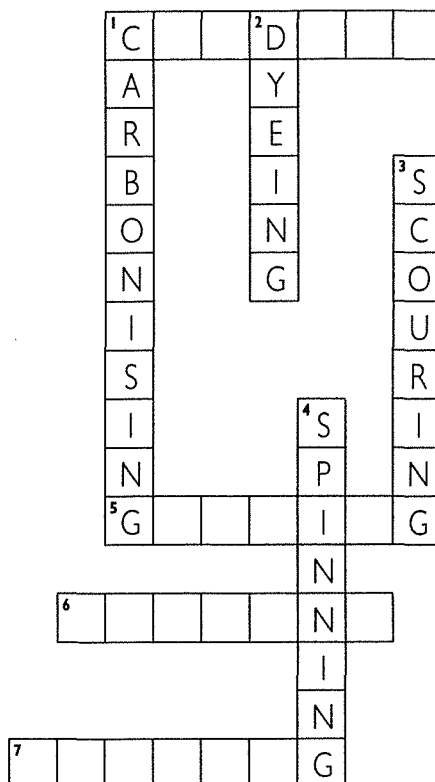
Puzzle A

Across words



Puzzle B

Down words



(Continued)

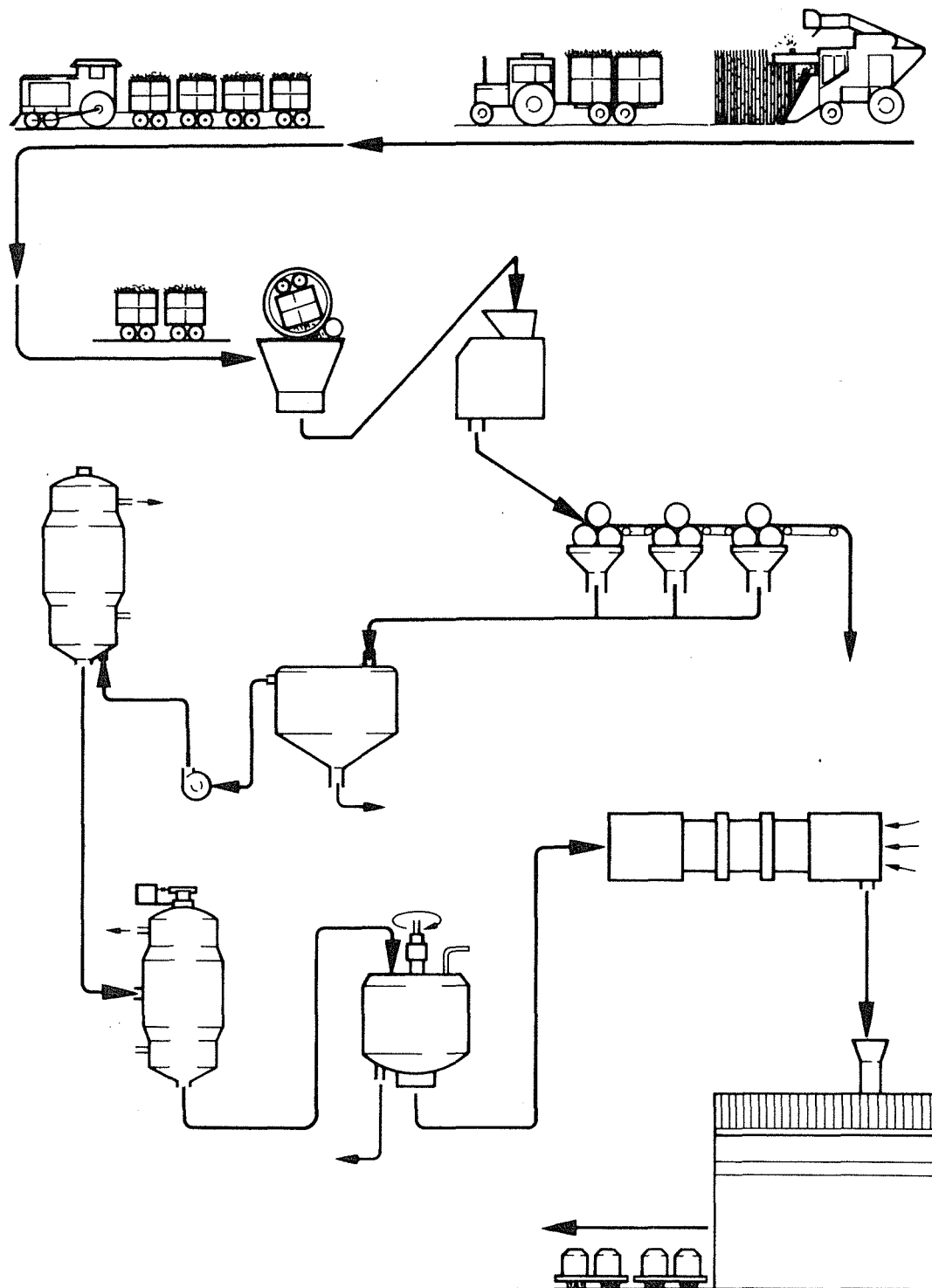
Note: All the words in this puzzle are names of processes.

Across

- Down*

- [illegible]

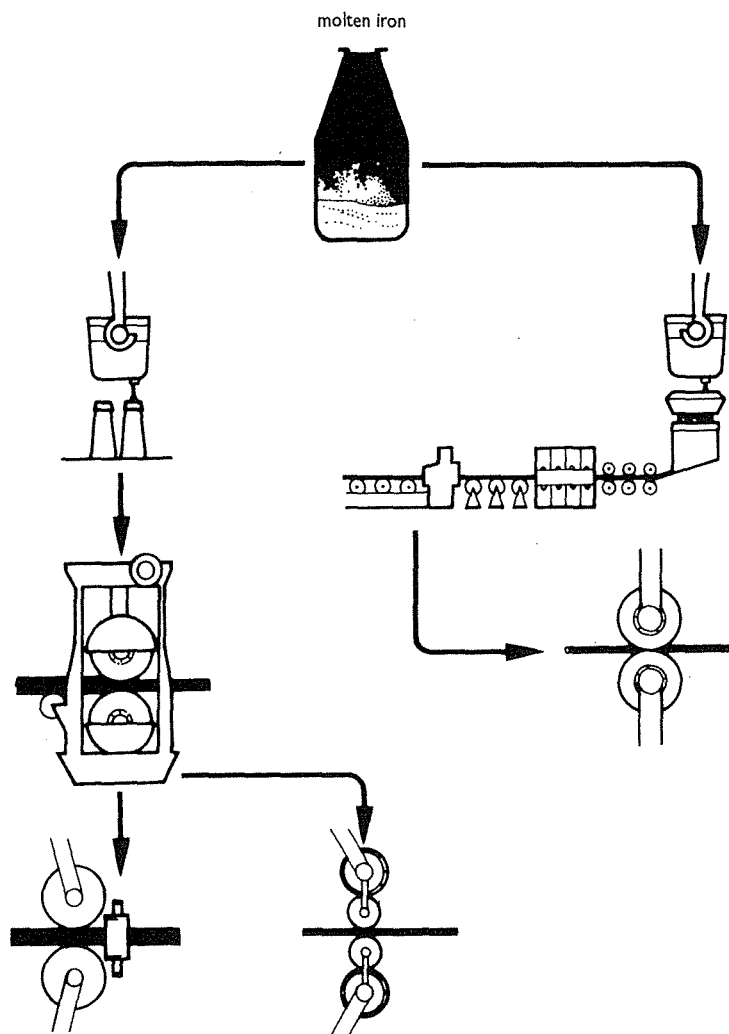
Processing sugar



Exercise 1: Label the diagram thoroughly. Use Chapter 7, in *Dynamic Science Book 2* to help.

Exercise 2: Use as many words from the sugar section and this diagram, to make the biggest word maze that you can.

Making iron into steel



Exercise 1: Label the diagram thoroughly. Use Chapter 7, in *Dynamic Science Book 2* to help.

Exercise 2: Imagine you are a plate of steel. Describe the processes you have been through, to become a plate of steel.

Chapter I topic test: Question sheet

Machines and devices

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

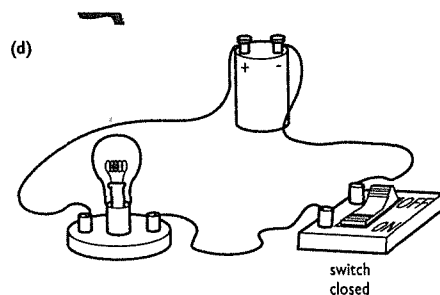
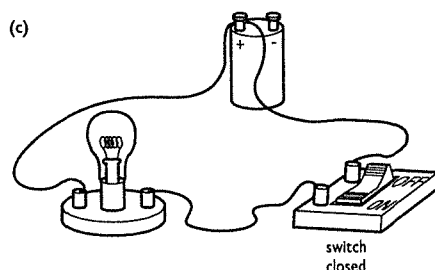
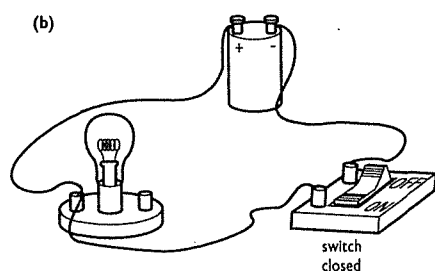
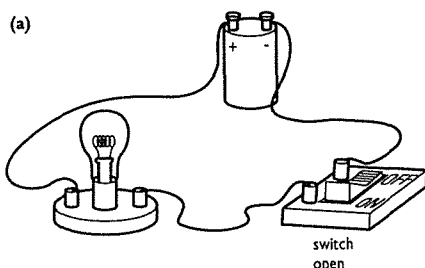
Multiple-choice questions

(5 × 1 = 5 marks)

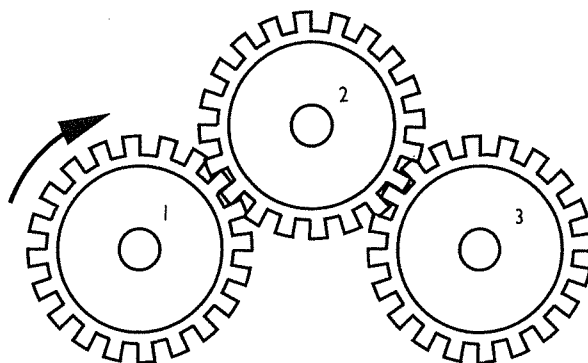
1. When tall trees fall across rivers, they sometimes form bridges. The type of bridge formed is a:

- (a) rigid beam bridge
- (b) cantilever bridge
- (c) steel arch bridge
- (d) concrete arch bridge

2. In which of the following circuits does the light glow?



3. Look at the gears in the figure. Wheel 1 is turned in a clockwise direction. The other wheels will move in a:

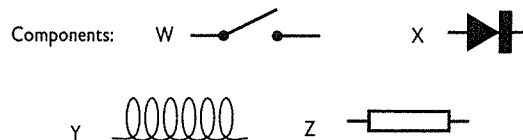


Wheel 2

Wheel 3

- | | |
|-----------------------------|-------------------------|
| (a) clockwise direction | clockwise direction |
| (b) anticlockwise direction | anticlockwise direction |
| (c) clockwise direction | anticlockwise direction |
| (d) anticlockwise direction | clockwise direction |

4. The diagram shows four symbols. The correct names of the components that they represent are:



Component:	W	X	Y	Z
(a) transistor	capacitor	inductor	diode	
(b) resistor	transistor	capacitor	switch	
(c) switch	diode	inductor	resistor	
(d) inductor	resistor	transistor	capacitor	

5. Imagine there has been an electrical accident. A person is touching live powerlines. To save the person's life, the *first* thing that should be done is:

- (a) call an ambulance
- (b) switch off the power, if possible
- (c) use a metal rod to separate the person and the powerline
- (d) apply mouth-mouth resuscitation

(Continued)

Section B

Short-answer questions

6. Use the words in the box to fill in the gaps in the sentences on your answer sheet. You will not use all of the words.

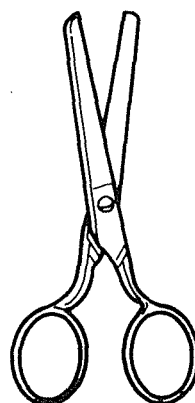
circuit machines electrical suspension
component battery cantilever electronic
lever arch rigid wheel contacts
structure current gear inclined plane

- (a) Simple _____ make life easier.
(b) Electrical _____ moves around a completed _____.
(c) A seesaw is an example of a/an _____.
(a type of machine).
(d) Cogs and gears are examples of _____, which are also a type of machine.
(e) Transistors, diodes and inductors are all examples of _____. (two words)
(f) The Sydney Harbour Bridge is an example of a/an _____ bridge.
(g) A _____ provides a convenient portable power source.
(h) Buildings and bridges are examples of _____. (10 x 1/2 = 5 marks)
7. Technology is changing our lives. Give two examples of how your life is different from the way people lived 100 years ago. (2 x 1 = 2 marks)

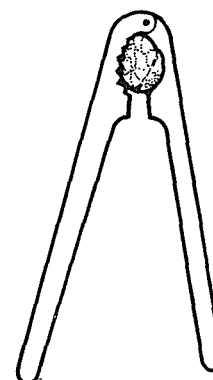
What order lever are the devices in the figure?

- (a) pair of scissors
(b) nutcracker
(c) hammer
(d) broom

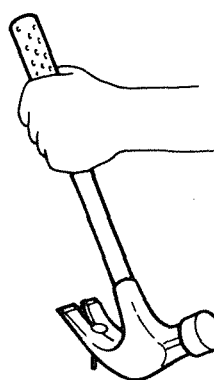
(4 x 1 = 4 marks)



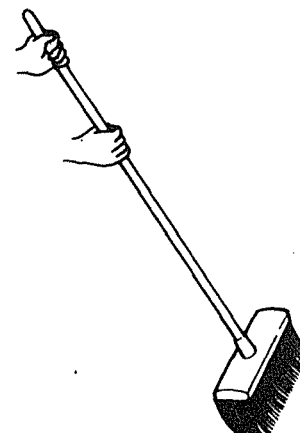
(a)



(b)



(c)



(d)

Section C

Longer questions

8. Use the table to answer the following question.

Types of levers

First order	Second order	Third order
Makes the effort or the movement bigger, depending on where the pivot is placed.	Always makes the effort bigger.	Always makes the movement bigger.
<p>L P E P (LPE or EPL)</p>	<p>L E L (PLE)</p>	<p>E L E P (LEP)</p>

Note: L means load, P means pivot or fulcrum, E means effort

9. Jenny and Sam were testing their model suspension bridge. The table shows the results to one of the tests that they carried out.

Number of strings supporting the bridge	Mass supported before the string or strings broke
2	250 g
4	550 g
6	800 g
8	1100 g

Answer the following questions:

- (a) What do you think was the aim of Jenny and Sam's experiment? (2 marks)
(b) What conclusion do you think they would have made? (1 mark)
(c) Suggest another test that could be carried out to find the strongest model suspension bridge in the class. (1 mark)

Total 20 marks

Chapter I topic test: Answer sheet

Machines and devices

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d

(5 × 1 = 5 marks)

Section B

Short-answer questions

6. Fill in the missing words.

- (a) Simple _____ make life easier.
- (b) Electrical _____ moves around a completed _____.
- (c) A seesaw is an example of a/an _____ (a type of machine).
- (d) Cogs and gears are examples of _____s, which are also a type of machine.
- (e) Transistors, diodes and inductors are all examples of _____s. (two words)
- (f) The Sydney Harbour Bridge is an example of a/an _____ bridge.
- (g) A _____ provides a convenient portable power source.
- (h) Buildings and bridges are examples of _____s.

(10 × ½ = 5 marks)

7. _____

(2 × 1 = 2 marks)

Section C

Longer questions

8. Order of the levers

- (a) pair of scissors _____
- (b) nutcracker _____
- (c) hammer _____
- (d) broom _____

(4 × 1 = 4 marks)

9. (a) The aim of the experiment

 _____ (2 marks)

(b) Conclusion

 _____ (1 mark)

(c) Another test

 _____ (1 mark)

Chapter 2 topic test: Question sheet

Earth's most important neighbours

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

(5 × 1 = 5 marks)

- There are many stories and legends relating to the phases of the Moon. In some of the stories the Moon becomes filled and then it empties. The names that we would give to the Moon at its filled and empty times are:
 - new Moon and quarter Moon
 - quarter Moon and full Moon
 - new Moon and half Moon
 - full Moon and new Moon
- The Sun's rays are least intense during:
 - summer
 - winter
 - autumn
 - spring
- Streams of gas that form the solar wind come from the layer of the Sun called the:
 - corona
 - chromosphere
 - photosphere
 - sunspots
- In a lunar eclipse:
 - the Sun moves between the Moon and the Earth, so the Moon cannot be seen
 - the Earth moves between the Sun and the Moon, so a shadow falls on the Moon
 - the Moon moves between the Sun and the Earth, so a shadow falls on the Earth
 - the Moon moves between the Earth and the Sun, so the Moon cannot be seen
- Imagine you were able to visit the Moon. The best scientific description of the 'moonscape' or surface would be:
 - the land is completely flat for as far as the eye can see
 - the dust on the Moon blows gently in the breeze
 - there are mountains and plains
 - the sedimentary rocks feel hard under your 'moon boots'

Section B

Short-answer questions

- On the diagram on the answer sheet, label the layers of the Sun. (2 marks)
- On the answer sheet, draw a diagram to show the relative positions of the Sun, Moon and Earth when there is a spring tide. (2 marks)
- In the space provided on the answer sheet, draw a diagram to show the relative positions of the Sun, Moon and Earth when there is a solar eclipse. Label the part of the Earth that has a:
 - total eclipse
 - partial eclipse
 (3 marks)

Section C

Longer questions

- Use the information given in the table to answer the questions that follow the table.

Day	Sunrise	Sunset	High tides	Low tides
Saturday	5.13 am	6.09 pm	2.15 am (1.1 m) 2.19 pm (1.4 m)	7.37 am (0.7 m) 9.16 pm (0.5 m)
Sunday	5.12 am	6.10 pm	3.24 am (1.1 m) 3.25 pm (1.4 m)	8.54 am (0.7 m) 10.11 pm (0.5 m)
Monday	5.11 am	6.10 pm	4.24 am (1.2 m) 4.23 pm (1.4 m)	10.03 am (0.7 m) 10.58 pm (0.5 m)

- What happens to the time of sunrise between Saturday and Monday? (1 mark)
 - Do you think that these days are in summer or winter? Explain your answer. (2 marks)
 - Beside the readings for the tides, there is a height of water given.
 - What is the height of the highest tide given in the table?
 - What is the height of the lowest tide given in the table? ($2 \times \frac{1}{2} = 1$ mark)
- Two students were discussing the seasons. Ali said that winter occurred because the Sun was further away during that season. Voula said that the Sun's rays were less intense in the wintertime.
 - Which student is correct? (1 mark)
 - Explain, using a labelled diagram, why you support either Voula or Ali. (3 marks)

Total 20 marks

Chapter 2 topic test: Answer sheet

Earth's most important neighbours

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

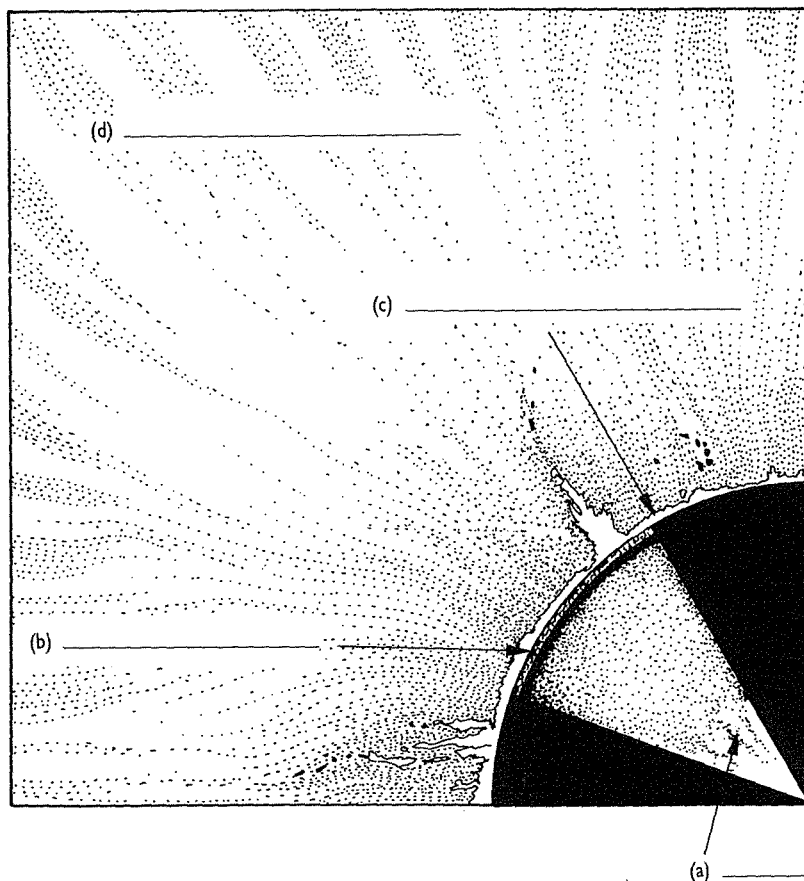
1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d

(5 × 1 = 5 marks)

Section B

Short-answer questions

6. Label the diagram.



(2 marks)

(Continued)

7. Diagram: Spring tide

(2 marks)

8. Diagram: Solar eclipse

(3 marks)

Section C

Longer questions

9. (a) _____

(1 mark)

(b) _____

(2 marks)

(c) (i) _____ (ii) _____

(2 × ½ = 1 mark)

10. (a) _____ is correct. (1 mark)

(b) _____

Diagram: Why is it coolest in winter?

(3 marks)

Chapter 3 topic test: Question sheet

Changes in life forms and living communities

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

(5 × 1 = 5 marks)

- Which of the following life forms would be the *least* likely to leave any fossilised remains?
 - a leaf
 - a jellyfish
 - a bird
 - a reptile
- Four students were studying some rocks. Each student claimed to have found a fossil in her/his rock sample. Both Juanita's and Jill's rocks were igneous. Jason's rock was sedimentary and Julian's was metamorphic. Which student/s may have had a fossil in their rock sample?
 - Juanita and Jill
 - Jason and Julian
 - Jason only
 - Julian only
- Where would a fossil most likely form?
 - in a cave in a desert
 - on a rocky shore where waves were breaking
 - in a fast running river
 - on rocks high in the mountains
- Scientists can change living things gradually by:
 - selective breeding
 - the use of chemicals, such as pesticides
 - changing the cells of living things
 - all of the above
- Salvinia weed is a plant that grows rapidly in waterways. It covers the surface of the water, and so marine life dies. Scientists discovered a weevil in South America, whose larvae eat the weed. When the discovery was made, the weevil was not immediately released into the weed-choked rivers in Australia. The most

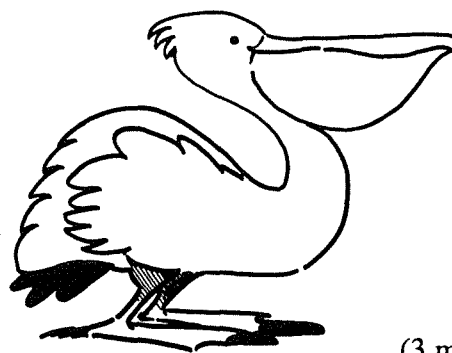
likely reason the weevil was not released immediately was that scientists:

- thought the weevil may not eat all the weed
- were worried the weevils might cause problems if they had no natural predator
- thought the weed would eventually die anyway
- thought they would find a better herbicide to kill the weed

Section B

Short-answer questions

- Look at the diagram of the pelican.
 - Name two adaptations of the pelican.
 - Why is each of these adaptations important?



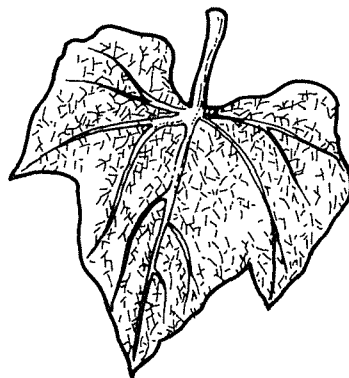
(3 marks)

- Explain briefly how *one* of the following fossils formed:
 - a carbon imprint of a leaf, or
 - a mould of a shell, or
 - a cast of a shell

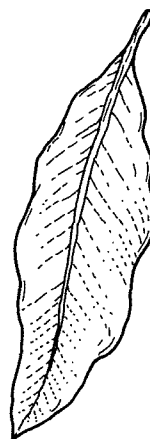
(2 marks)

(Continued)

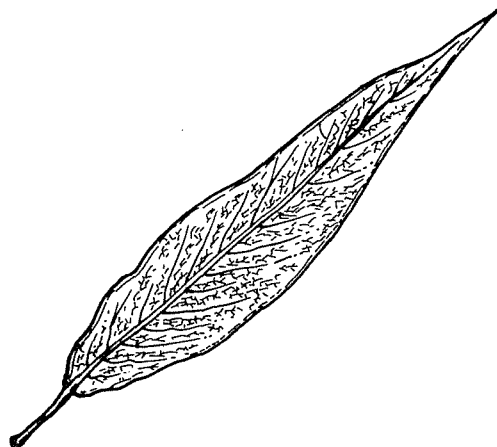
8. The diagrams show four leaves.
- (a) Which two out of the four leaves are most closely related?
 - (b) Explain your choice. (2 marks)



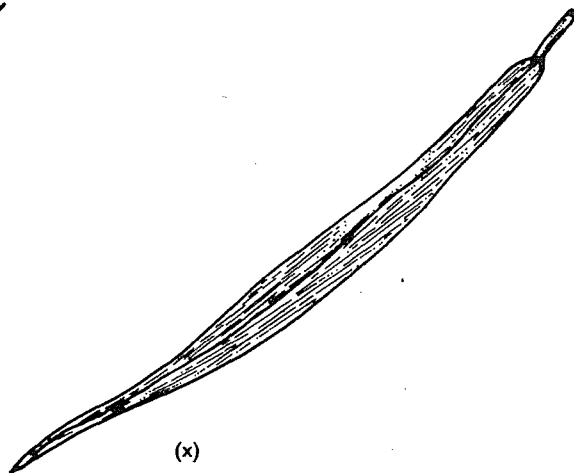
(u)



(v)



(w)



(x)

Section C

Longer questions

9. On the planet Zot, there are green and yellow Zottians. One part of Zot, Zatland, is famous for its yellow trees and flowers. Another part of Zot is Zetland, where there are lush rainforests. The Quokkians from a neighbouring planet are about to invade Zot.
- (a) Where could the Zottians hide?
 - (b) Explain your choice/s. (4 marks)

10. Krill, a small type of shrimp, are eaten by baleen whales. People are now catching krill for food. (The krill eat small green plants called plankton.)
- (a) Write a food chain for the baleen whale.
 - (b) How are people affecting this food chain?
 - (c) What will happen if people continue to affect the food chain? (4 marks)

Total 20 marks

Chapter 3 topic test: Answer sheet

Changes in life forms and living communities

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d

4. a b c d

2. a b c d

5. a b c d

3. a b c d

(5 x 1 = 5 marks)

Section B

Short-answer questions

6. (a) Two adaptations are: _____

and _____

(2 x ½ = 1 mark)

(b) _____

(2 x 1 = 2 marks)

7. _____

(2 marks)

8. (a) Leaves — and — are most closely related.

(b) _____

(2 marks)

Section C

Longer questions

9. (a) _____

(2 marks)

(b) _____

(2 marks)

10. (a) Food chain

(2 marks)

(b) _____

(1 mark)

(c) _____

(1 mark)

Chapter 4 topic test: Question sheet

Obtaining and using energy

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

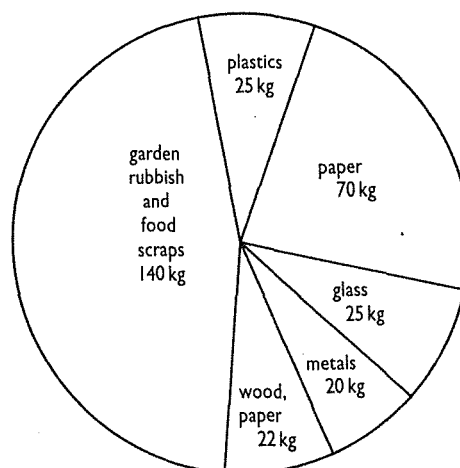
Multiple-choice questions

(5 × 1 = 5 marks)

- Which of the following lists contains examples of fossil fuels only?
 - wood, oil, coal
 - coal, uranium, natural gas
 - electricity, wood, uranium
 - oil, natural gas, coal
- Which of the following lists of types of power stations may use steam to drive the turbines?
 - nuclear, coal-fired, oil-fired
 - wave, tidal, hydroelectric
 - hydroelectric, photovoltaic, OTEC (ocean thermal energy conversion)
 - geothermal, tidal, wind

Questions 3 and 4 refer to the pie chart. The pie chart shows the composition of household garbage (by mass per year) for the average person living in a town in the early 1990s.

- The pie chart shows the smallest percentage of waste comes from:
 - glass
 - metals
 - wood and paper
 - plastics



- Which method would cut down the greatest amount of household waste?
 - make a mulch heap with food and garden rubbish
 - recycle all metals
 - burn paper and wood
 - recycle glass
- Two students were discussing how to produce an electric current using a magnet and a coil of wire. Nina said that to produce a current:
 - it did not matter whether the magnet or the coil was moved, as long as one of them was moved
 - the magnet had to be inside the coil when the relative movement occurredBarry said that to produce a current:
 - a stationary magnet placed either inside or outside a stationary coil was the only requirement.From these statements, which of the following is true?
 - Nina is always correct and Barry is sometimes correct
 - Nina and Barry are both incorrect
 - Nina is always correct and Barry is incorrect
 - Nina is incorrect and Barry is correct

(Continued)

Section B**Short-answer questions**

6. Complete the following table, on the answer sheet

<i>Method of power production</i>	<i>One advantage</i>	<i>One disadvantage</i>
(a) _____	renewable	radioactive wastes
(b) wind	_____	noise
(c) hydroelectricity	renewable	_____
(d) coal-fired	_____	_____
(e) tidal	renewable	_____

(3 marks)

(4 marks)

7. List four ways we could save energy at home.

Section C**Longer question**

8. Read the passage and answer the following questions.

Governments are becoming more aware of problems in the environment. They are trying to encourage people to conserve energy by reducing the amount of rubbish, and reusing and recycling goods.

Some councils mulch the wood of trees that have been uprooted in storms. This mulch is then sold and used as fertiliser. Other councils are using materials from demolished buildings. These materials may be crushed and used as small rocks for building roads.

Some outdoor furniture, children's playground equipment, garbage bags and containers are now made from recycled plastic. Paper, aluminium cans and glass have been successfully recycled for many years.

Even gas produced from rotting rubbish is being used by some councils. The gas is the fuel used to produce small amounts of electricity.

- (a) What are the three ways to conserve energy listed in the passage? (3 marks)
- (b) What use can be made of the wood from fallen trees? (1 mark)
- (c) Give two examples of uses for recycled plastic. (2 marks)
- (d) Name one material that has been recycled for many years. (1 mark)
- (e) What use can be made of gas obtained from rotting garbage? (1 mark)

Total 20 marks

Chapter 4 topic test: Answer sheet

Obtaining and using energy

Name: _____

Class: _____

Section A**Multiple-choice questions**

Circle the best answer for each of the following questions.

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d

(5 × 1 = 5 marks)

Section B**Short-answer questions**

6.

<i>Method of power production</i>	<i>One advantage</i>	<i>One disadvantage</i>
(a) _____	renewable	radioactive wastes
(b) wind	_____	noise
(c) hydroelectricity	renewable	_____
(d) coal-fired	_____	_____
(e) tidal	renewable	_____

(3 marks)

7. (a) _____
- (b) _____
- (c) _____
- (d) _____

(4 marks)

Section C**Longer questions**

8. (a) (i) _____
- (ii) _____
- (iii) _____
- (b) _____
- (c) (i) _____
- (ii) _____
- (d) _____
- (e) _____

(3 marks)

(1 mark)

(2 marks)

(1 mark)

(1 mark)

Chapter 5 topic test: Question sheet

Changes as people grow

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

(5 × 1 = 5 marks)

1. In our society, people reach puberty when they are in the stage of life that is called:
 - (a) childhood
 - (b) menopause
 - (c) adolescence
 - (d) adulthood
2. Which of the following statements about sperm is true?
 - (a) Males are born with sperm in their testes
 - (b) Sperm are produced at and after puberty
 - (c) One sperm can fertilise many ova
 - (d) Sperm are much larger than ova
3. When a female reaches menopause, she:
 - (a) starts menstruating
 - (b) gives birth to her baby
 - (c) is pregnant
 - (d) stops menstruating
4. Which of the following statements about the developing baby is true?
 - (a) The baby obtains food and oxygen directly from the mother's blood in its umbilical cord
 - (b) The baby's blood and mother's blood do not mix
 - (c) All the baby's waste materials, including dead skin cells, move out through the umbilical cord
 - (d) The baby does not move in the uterus
5. Which of the following lists correctly describes the normal birth process? The baby moves in the following way:
 - (a) uterus → cervix → vagina
 - (b) cervix → uterus → vagina
 - (c) uterus → vagina → cervix
 - (d) vagina → uterus → cervix

Section B

Short-answer questions

6. Name the structures that produce sex hormones in the:
 - (a) male
 - (b) female
 (1 mark)
7. On the diagram on the answer sheet:

Add the correct labels for (a), (b) and (c).

- (d) Draw arrows to show the path followed by sperm as they travel in the male reproductive system. (2 marks)

8. Give an example of a health problem that may occur in the reproductive system. (1 mark)
9. Two babies in the uterus are sharing one placenta.
 - (a) Are these twins identical or non-identical?
 - (b) How do identical and non-identical twins form? (3 marks)

Section C

Longer questions

10. Use the table to answer the questions that follow the table.

Country	Infant mortality rate (deaths per 1000 births)	Birthrate (per 1000 approx., 1990)
Australia	8	15
China	33	21
Ecuador	63	36
Ethiopia	168	49
Greece	12	11
India	17	30
Indonesia	30	43
Japan	5	11
Malaysia	25	42
Sweden	3	12
USA	10	9
Vietnam	68	33

- (a) Which country has the infant mortality rate per 1000 births that is the:
 - (i) highest?
 - (ii) lowest? (2 marks)
- (b) Which country has the birth rate per 1000 people that is the:
 - (i) highest?
 - (ii) lowest? (2 marks)
- (c) Is there any relationship between the infant mortality rate and the birthrate? Explain your answer. (2 marks)
11. Briefly describe what happens to skin as it ages. Remember to mention the names of two special substances found in skin. (2 marks)

Total 20 marks

Chapter 5 topic test: Answer sheet

Changes as people grow

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d
2. a b c d
3. a b c d
4. a b c d
5. a b c d

(5 × 1 = 5 marks)

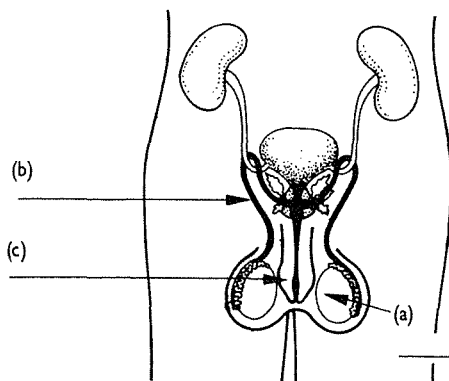
Section B

Short-answer questions

6. (a) _____

(b) _____ (1 mark)

7. _____



(2 marks)

8. _____

_____ (1 mark)

9. (a) _____ (1 mark)

(b) _____

_____ (2 marks)

Section C

Longer questions

10. (a) (i) _____

(ii) _____ (2 marks)

(b) (i) _____

(ii) _____ (2 marks)

(c) _____

_____ (2 marks)

11. _____

_____ (2 marks)

Chapter 6 topic test: Question sheet

Changes in the Earth's atmosphere

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

(5 × 1 = 5 marks)

1. Smog is caused when large amounts of certain oxides are present in the atmosphere. The main oxides in photochemical smog are compounds of the element:
 - (a) hydrogen
 - (b) argon
 - (c) nitrogen
 - (d) carbon
2. pH of acid rain may be about:
 - (a) zero
 - (b) six
 - (c) seven
 - (d) fourteen
3. On a weather map a tropical cyclone would appear as a:
 - (a) high pressure system with isobars close together
 - (b) low pressure system with isobars close together
 - (c) high pressure system with isobars far apart
 - (d) low pressure system with isobars far apart
4. Which of the following wind symbols shows a windspeed of greater than 42 km/h?

(a) _____ (b) _____ (c) _____ (d) _____
5. Three students are comparing two days.
 - Day 1 had a humidity reading of 75% and a maximum temperature of 35°C.
 - Day 2 had a humidity reading of 15% and a maximum temperature of 25°C.

Mia said that day 1 was hotter and more sticky than day 2.

Andy said that day 1 did not feel hot because the humidity made the day feel cooler and more pleasant than day 2.

George said that day 2 was cooler and much more comfortable than day 1.

Who was correct?

 - (a) Mia and George
 - (b) Andy only
 - (c) Mia only
 - (d) George only

Section B

Short-answer questions

On the answer sheet write true or false for each of the following statements:

6. (a) The winds near the Equator that circle the Earth are the strongest in the world.
- (b) Sleet is a type of precipitation.
- (c) Volcanoes send only solids into the air during an eruption.
- (d) A hygrometer measures air pressure.
- (e) Winds move in opposite directions in high pressure systems in the Northern and Southern Hemispheres.
- (f) Rainbows form when light is bent by drop-lets of water. (3 marks)
7. One of the acids that occurs naturally in acid rain is carbonic acid (H_2CO_3). This acid forms when a particular gas dissolves in water. Name the gas. (1 mark)
8. What are monsoons? (1 mark)
9. Complete this table on your answer sheet:

Weather instrument	What it measures	Units used
(a) _____ anemometer	air pressure wind speed and (c) _____	(b) _____ kilometres per hour (km/h)
(d) _____	relative humidity	percentage humidity
(e) _____	rainfall	(f) _____

(3 marks)

Section C

Longer questions

10. In the space on the answer sheet, draw two diagrams and briefly explain how
 - (a) onshore winds form
 - (b) offshore winds form (4 marks)
11. Volcanoes cause changes in the atmosphere when they erupt.
 - (a) List at least two examples of substances that enter the atmosphere when a volcano erupts. (2 marks)
 - (b) What effect can volcanoes cause thousands of kilometres away? (1 mark)

Total 20 marks

Chapter 6 topic test: Answer sheet

Changes in the Earth's atmosphere

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d

2. a b c d

3. a b c d

4. a b c d

5. a b c d

(5 × 1 = 5 marks)

Section B

Short-answer questions

6. (a) _____ (d) _____

(b) _____ (e) _____

(c) _____ (f) _____

(6 × ½ = 3 marks)

7. _____ (1 mark)

8. _____

_____ (1 mark)

9.

<i>Weather instrument</i>	<i>What it measures</i>	<i>Units used</i>
(a) _____	air pressure	(b) _____
anemometer	wind speed and	kilometres per
	(c) _____	hour (km/h)
(d) _____	relative humidity	percentage
		humidity
(e) _____	rainfall	(f) _____

(6 × ½ = 3 marks)

Section C

Longer questions

10.

(4 marks)

11. (a) _____

(2 marks)

(b) _____

(1 mark)

Chapter 7 topic test: Question sheet

Obtaining and using substances: Part I Water

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

1. Water can move up tiny tubes, going against the force of gravity. This property of water is called:
 - (a) solubility
 - (b) capillarity
 - (c) turbidity
 - (d) salinity
2. Imagine that you are lost in the outback, and you can find only muddy, salty water to drink. The best method to ensure that you survive, would be to:
 - (a) drink the water as it is
 - (b) strain the water through some fine cotton material before drinking it
 - (c) set up a system to evaporate the water and condense the vapour before drinking it
 - (d) let the mud settle to the bottom and drink the water left on the top
3. Salt is dropped on roads covered in snow in some countries. The salt is dropped to:
 - (a) provide more friction, so car tyres do not slip
 - (b) increase the melting point of water, so the cars have a solid surface on which to drive
 - (c) make the snow a more attractive white colour
 - (d) lower the melting point of the snow, to make the snow melt (3 × 1 = 3 marks)

Section B

Short-answer questions

4. Chemicals are sometimes added to water. Why? (1 mark)
5. What is an aquifer? (1 mark)
6. Your friend tells you that water at her home is very hard. How could you check if your friend is correct? (1 mark)
7. One way to test water is to find its pH. What should the pH of drinking water be? (1 mark)

Section C

Longer questions

8. Farmer Jones wanted to build a dam on her property. She had three different places, X, Y and Z, where the dam could be built.

Position X: deep, sandy soil in the middle of a natural bush area

Position Y: shallow topsoil with clay underneath in an open area

Position Z: an open area where a shallow layer of clay had been placed on top of sand

 - (a) Where should Farmer Jones build her dam? (1 mark)
 - (b) Explain your choice. (2 marks)

Total 10 marks

Chapter 7 topic test: Answer sheet

Obtaining and using substances: Part I Water

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d

2. a b c d

3. a b c d

(3 x 1 = 3 marks)

Section B

Short-answer questions

4. _____

(1 mark)

5. _____

(1 mark)

6. _____

(1 mark)

7. _____

(1 mark)

Section C

Longer questions

8. (a) Position _____
(b) _____

(1 mark)

(2 marks)

Chapter 7 topic test: Question sheet

Obtaining and using substances: Part 2 Wool

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

1. Australian wool comes mainly from:
 - (a) Cape fat tail sheep
 - (b) Polwarth sheep
 - (c) Merino sheep
 - (d) Corriedale sheep
2. The woollen system of processing wool is different from the worsted system. In the worsted system:
 - (a) there are extra processes, including gilling and combing
 - (b) there are fewer processes than in the woollen system
 - (c) poorer quality fibres are produced
 - (d) spinning and carding are *not* included
3. In the carbonising process:
 - (a) wool is washed thoroughly to remove lanolin
 - (b) wool is placed in sulfuric acid, which reacts with plant matter, and then the wool is heated
 - (c) wool is blasted with carbon dioxide to make the fibres fluffy
 - (d) carbon particles are added to wetted wool to remove odours from the wool

(3 × 1 = 3 marks)

Section B

Short-answer questions

4. Sheep can eat plants down to ground level. Name one problem caused when sheep overgraze. (1 mark)
5. List two properties of wool that make wool a useful fibre. (2 marks)
6. Why do woollen fibres mat together? (1 mark)

Section C

Longer question

7. Two students, Zelda and Abe, carried out an activity to investigate how different fibres burnt. The following table lists their results.

Fibre	Observations
cotton	burns quickly and easily
wool	difficult to burn, burns slowly
nylon	catches fire quickly and melts away from the flame, rather than burns

Using Zelda and Abe's results, answer the questions.

- (a) Which of these three fabrics would be best for making fire-resistant clothing? Why?
- (b) Through which of these three fabrics would flames probably spread most quickly? Why? (2 × 1½ = 3 marks)

Total 10 marks

Chapter 7 topic test: Answer sheet
Obtaining and using substances: Part 2 Wool

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d

2. a b c d

3. a b c d

(3 × 1 = 3 marks)

Section B

Short-answer questions

4. _____

(1 mark)

5. _____

(2 marks)

6. _____

(1 mark)

Section C

Longer question

7. (a) _____

(1½ marks)

(b) _____

(1½ marks)

Chapter 7 topic test: Question sheet

Obtaining and using substances: Part 3 Sugar

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

1. Pure sugar is a:
 - (a) mixture of carbon, oxygen and hydrogen
 - (b) compound of carbon, oxygen and hydrogen
 - (c) made of the element carbon only
 - (d) mixture of the element carbon and a compound of hydrogen and oxygen
2. Use the table to answer the question that follows.

Cereal	Sugar content per 30 g serve
Oatos	6.1 g
Wheatos	0.5 g
Brannos	3.2 g
Ricebicks	2.1 g
Cornpops	4.6 g
Muesli munch	2.8 g

From the table, it is true to say that:

- (a) Muesli munch contains more sugar than Ricebicks, but less sugar than Wheatos
 - (b) Cornpops contain more sugar than Oatos but less sugar than Brannos
 - (c) Ricebicks contain more sugar than Muesli munch but less sugar than Oatos
 - (d) Brannos contain more sugar than Ricebicks but less sugar than Cornpops
3. Processing of sugarcane is often said to be energy-efficient because electricity to run the mill comes from:
 - (a) burning bagasse to heat water
 - (b) burning sugar to heat water
 - (c) sugar solution falling from a great height to drive the turbines
 - (d) heating sugar products, such as molasses, to drive the turbines

(3 × 1 = 3 marks)

Section B

Short-answer questions

4. Name two separation processes involved in the processing of sugar. (2 marks)
5. List two examples to support the statement that 'Growing sugarcane requires energy'. (2 marks)

Section C

Longer question

Answer *either* (a) *or* (b). *Do not answer both!*

6. (a) Imagine you have been given some sugar that has had some coarse sawdust dropped into it. You need to obtain pure sugar from the mixture. Briefly describe how you could separate the sawdust from the sugar. (3 marks)

or

6. (b) Give two examples of how cane growing may affect the environment. (2 × 1½ = 3 marks)

Total 10 marks

Chapter 7 topic test: Answer sheet
Obtaining and using substances: Part 3 Sugar

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d
2. a b c d
3. a b c d

(3 x 1 = 3 marks)

Section B

Short-answer questions

4. _____

(2 marks)

5. _____

(2 marks)

Section C

Longer question

6. Answer *either* (a) *or* (b). *Do not answer both!*

(3 marks)

Chapter 7 topic test: Question sheet

Obtaining and using substances: Part 4 Steel

Do not write on this paper. Write all answers on the answer sheet provided.

Section A

Multiple-choice questions

1. Stainless steel is produced:
 - (a) using a special type of iron ore
 - (b) by coating the steel with a special material after it is made
 - (c) when chromium, carbon and nickel are alloyed with the steel
 - (d) by polishing the steel after it has been made
2. It is true to say that:
 - (a) substances containing iron and steel are usually easily magnetised
 - (b) substances containing only iron are easily magnetised
 - (c) substances containing only steel are easily magnetised
 - (d) magnets are never made from iron and steel
3. For steel to rust:
 - (a) only pure water or pure water vapour needs to be present
 - (b) only air needs to be present
 - (c) both water and air need to be present
 - (d) neither water nor air needs to be present

(3 × 1 = 3 marks)

Section B

Short-answer questions

4. List the three main ingredients needed to make steel. (1½ marks)
5. How is coke formed? (1½ marks)
6. Name the main places in Australia where the following are mined:
 - (a) iron ore
 - (b) limestone(1 mark)

Section C

Longer questions

7. (a) What is slag?
(b) What substance is added to the furnace to make slag form? (2 marks)
8. Give one example of how the steel industry is trying to look after the environment. (1 mark)

Total 10 marks

Chapter 7 topic test: Answer sheet

Obtaining and using substances: Part 4 Steel

Name: _____

Class: _____

Section A

Multiple-choice questions

Circle the best answer for each of the following questions.

1. a b c d

2. a b c d

3. a b c d

(3 x 1 = 3 marks)

Section B

Short-answer questions

4. _____

(1½ marks)

5. _____

(1½ marks)

6. Iron ore comes from _____.

Limestone comes from _____ (1 mark)

Section C

Longer questions

7. (a) _____

(b) _____

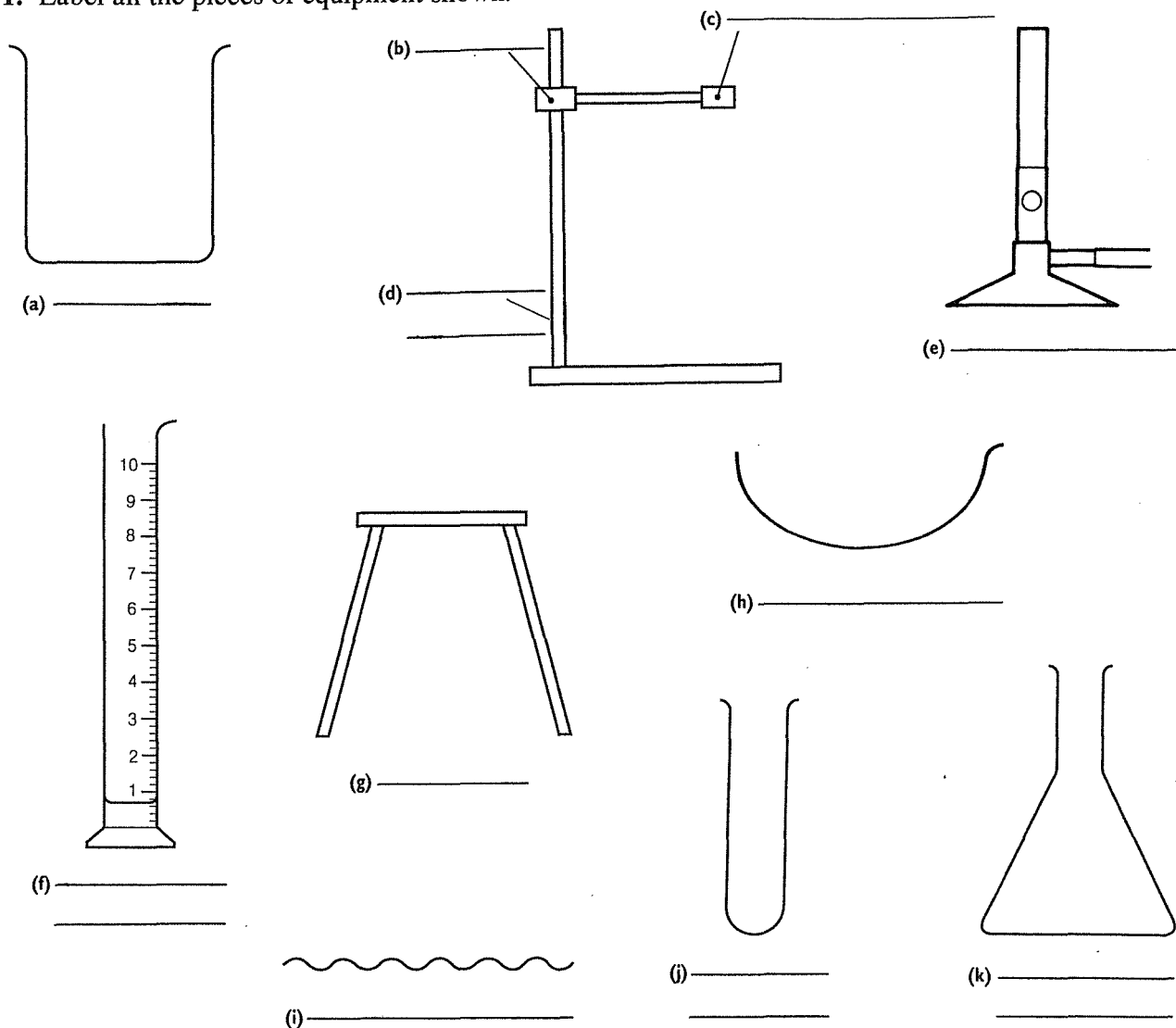
(2 marks)

8. _____

(1 mark)

Equipment review

1. Label all the pieces of equipment shown.



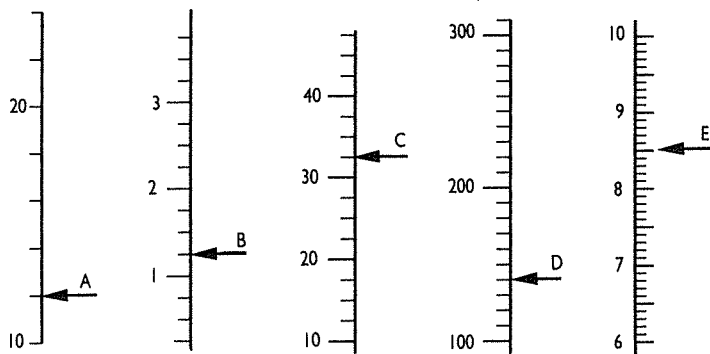
2. Which of the above pieces of equipment would you use to do the following?

- (i) measure a volume of liquid accurately _____
- (ii) heat a beaker of water _____
- (iii) evaporate a solution, containing a salt, to dryness _____
- (iv) support a thermometer, held in a stopper, above the bench _____

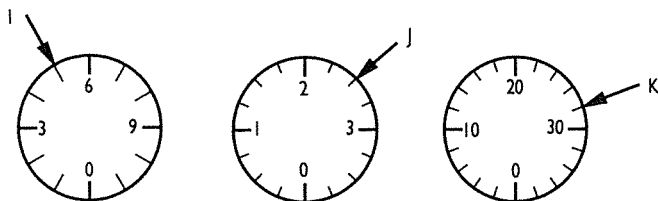
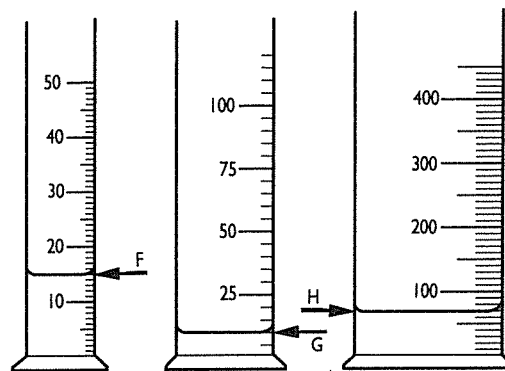
3. Explain the correct method for safely using a Bunsen burner.

Reading scales

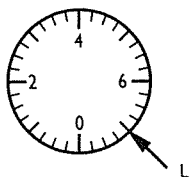
Read the scales and record your readings in the spaces provided.



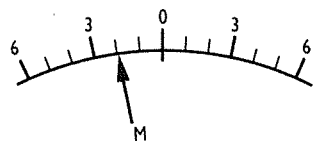
(a) _____ (b) _____ (c) _____ (d) _____ (e) _____ (f) _____ mL (g) _____ mL (h) _____ mL



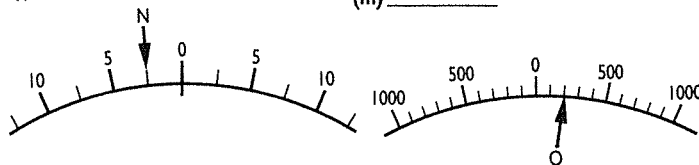
(i) _____ (j) _____ (k) _____



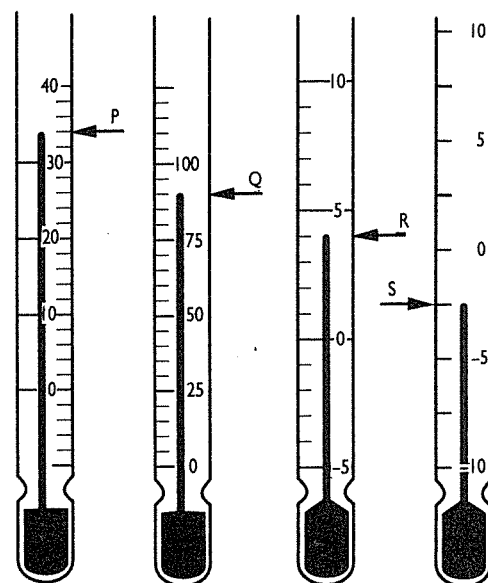
(l) _____



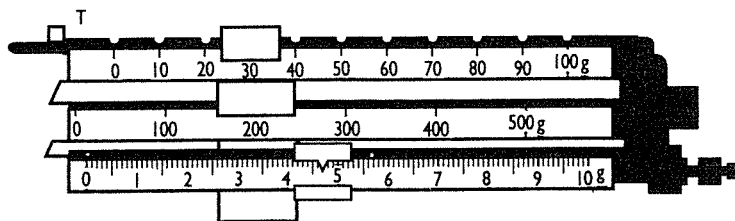
(m) _____



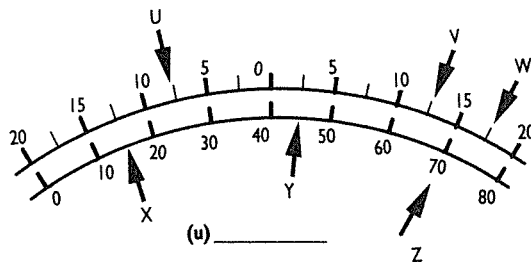
(n) _____ (o) _____



(p) _____ °C (q) _____ °C (r) _____ °C (s) _____ °C

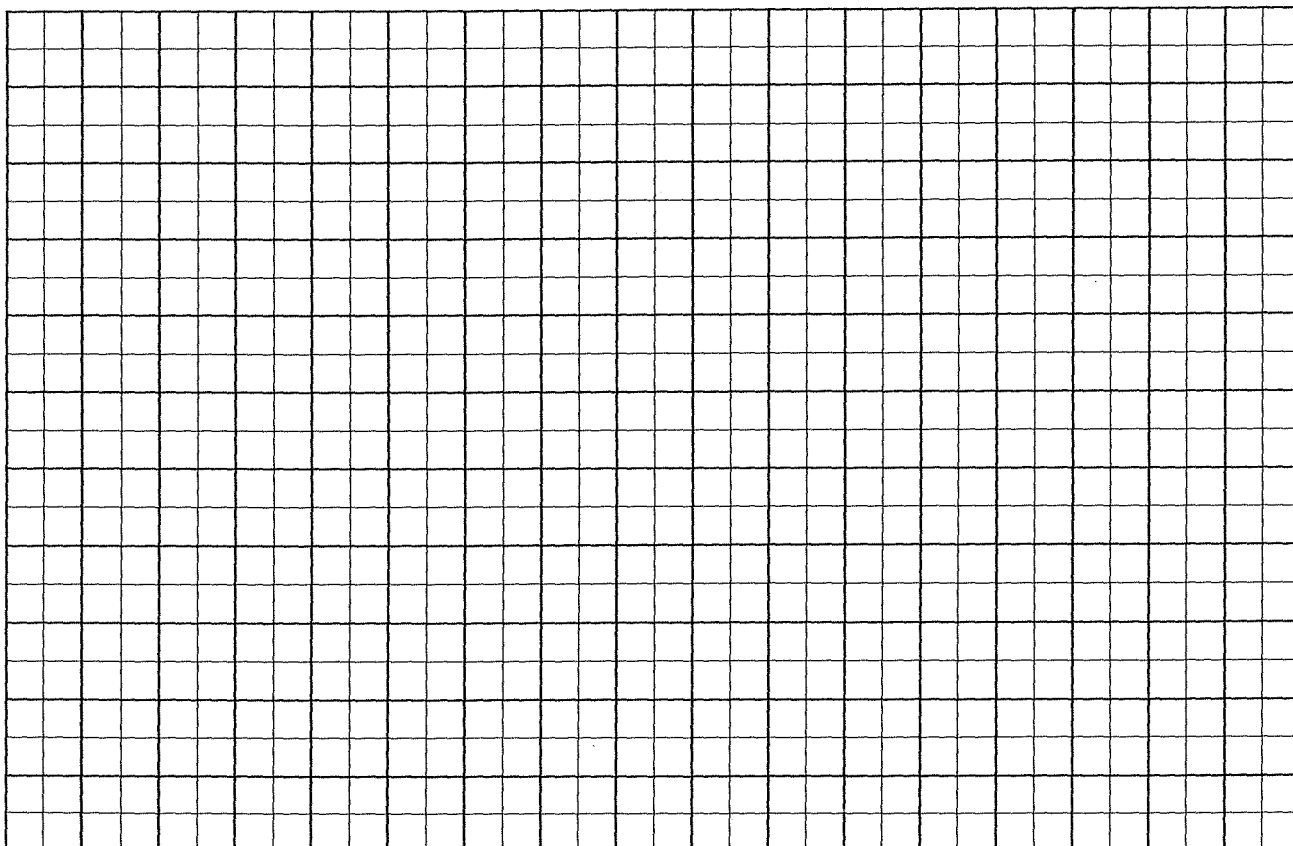
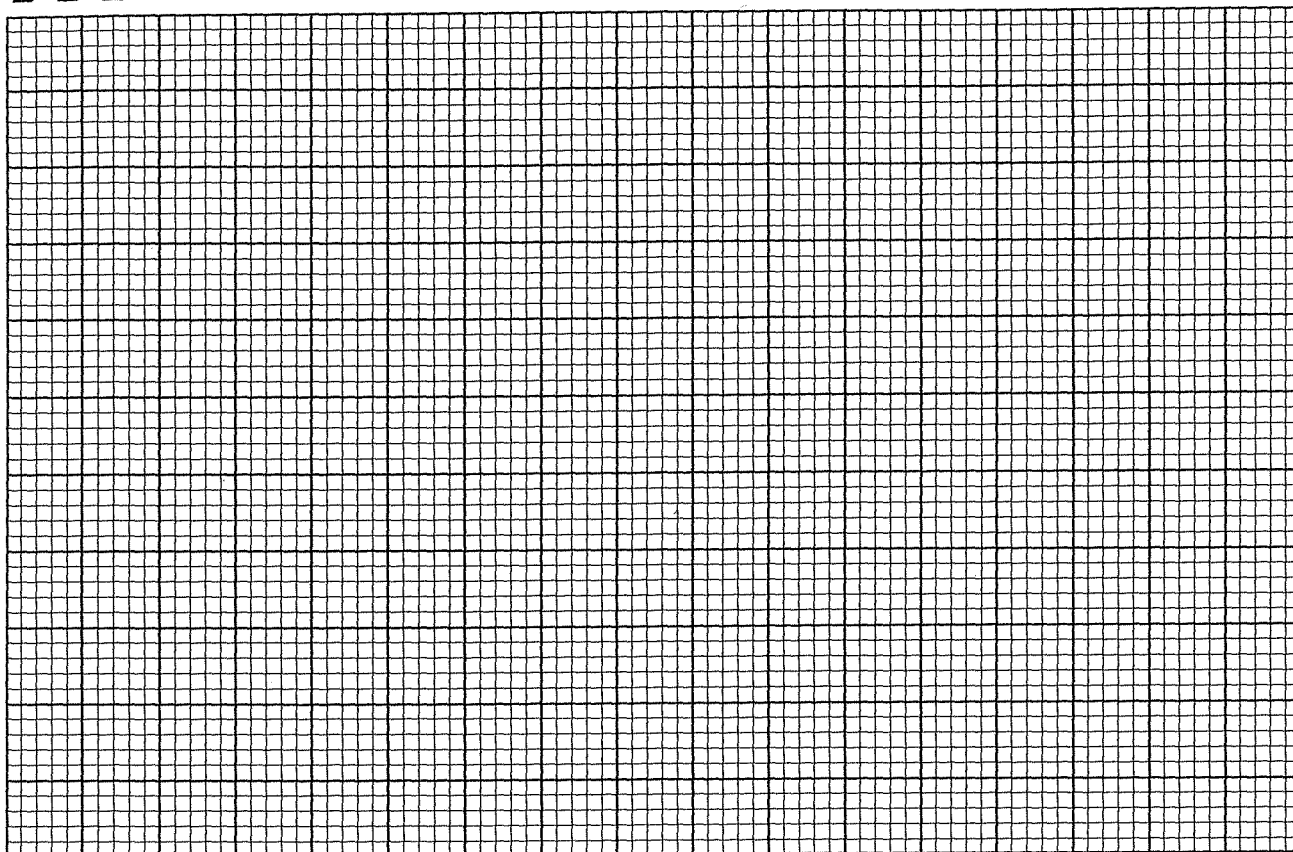


(t) _____



(u) _____
(v) _____
(w) _____
(x) _____
(y) _____
(z) _____

Graph and grid paper for student use



Bingo board squares

Photocopy, stick onto sturdy paper and cut board to required size.

Remember: Rectangles can be shaded or left blank, according to the number required for a particular bingo game.

Answers to Blackline masters

BLM 1: Which airliner can travel faster than 2300 km/h?

Concorde

BLM 2: Four famous scientists

1. Marie Curie
2. Barbara McClintock
3. Jocelyn Bell
4. Lise Meitner

BLM 3: An enlightening problem

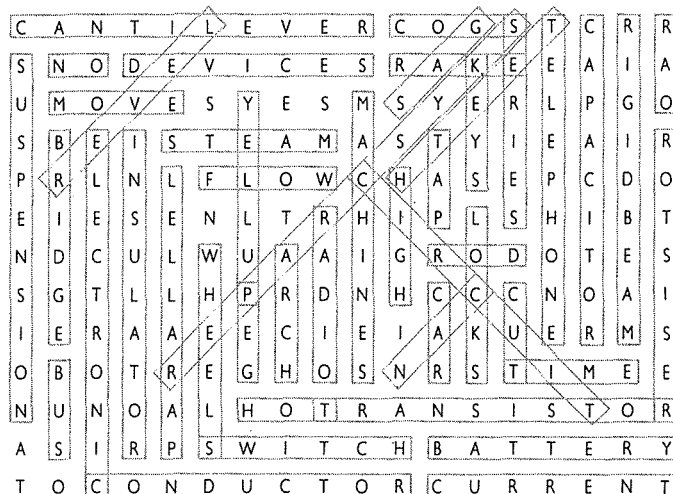
- Circuit A: 9 globes glowing
 Circuit B: 7 globes glowing
 Circuit C: 9 globes glowing
 Circuit D: 3 globes glowing

Extension

- Circuit A: 9 globes alight
 Circuit B: 9 globes alight
 Circuit C: 11 globes alight
 Circuit D: 9 globes alight

BLM 4: Machines and devices word maze

1. Machines, devices
2. lever
3. can, pulley
4. teeth, cogs
5. rake, oar, rod
6. peg, keys, locks, time, taps, move, telephone, radio
7. car, bus
8. gas, steam
9. battery
10. circuit, series, parallel
11. current, flow
12. electronic, capacitor, transistor
13. resistor
14. bridge, skyscrapers
15. cantilever, rigid beam, suspension, arch



Other words in the puzzle include:
 conductor, insulator, switch, high, time.

BLM 5: A simple and clever device

1. Machines
 2. towEr
 3. Lever
 4. circuit
 5. canTilever
 6. Thomas Edison
 7. bAtteries
 8. Beam
 9. pullEys
 10. coNcrete
 11. sTructures
 12. Zero
- Answer: Melitta Bentz

BLM 6: A very ancient device: A comprehension exercise

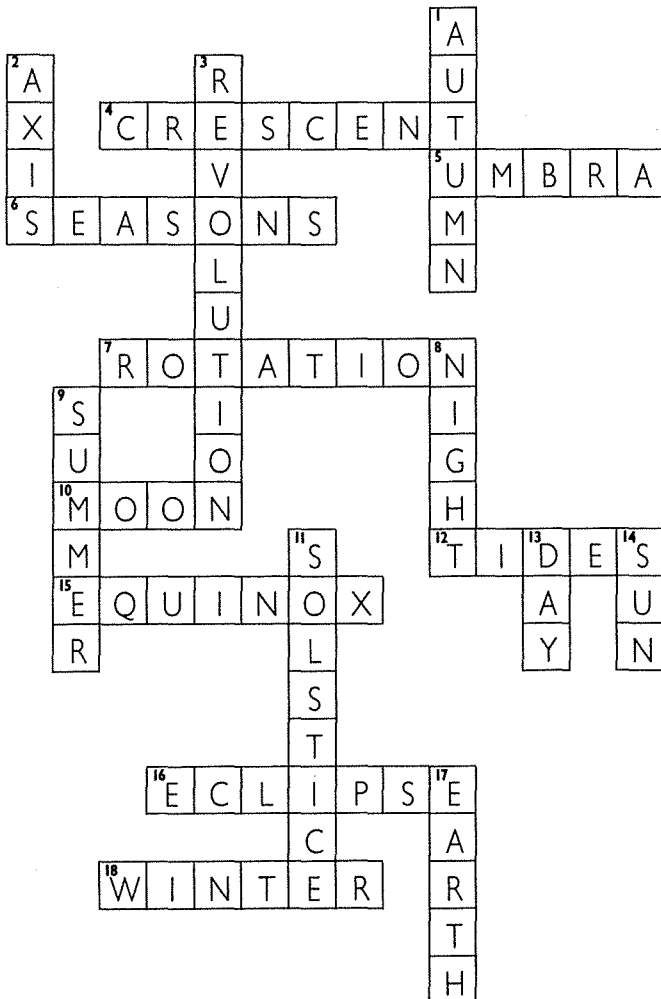
2. The Baghdad battery was a clay object that looked like a vase. The object contained a copper cylinder and an iron rod.
3. The Baghdad battery is thought to be more than 1800 years old.
4. Volta produced the first modern battery.
5. His battery was made using a stack of zinc and silver plates, with paper soaked in salt solution between each plate.

BLM 9: How far is that star?

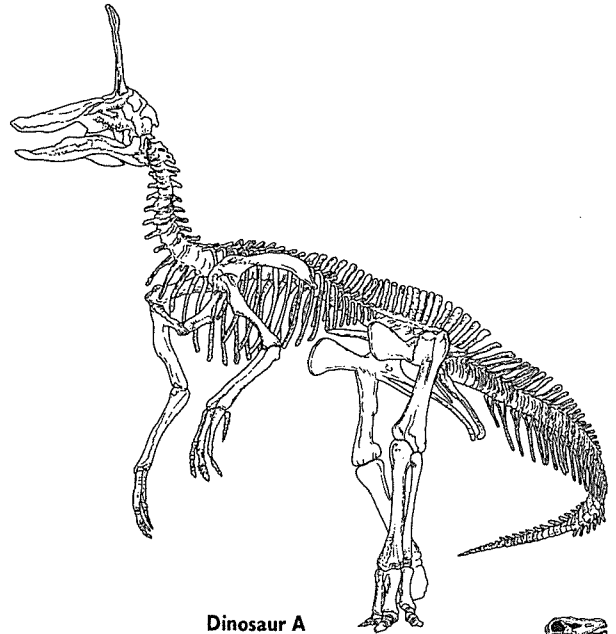
1. Distances in space are so large that normal numbers were difficult to use.
2. A light-year is the distance that light travels in one year.
3. The nearest star to Earth is Proxima Centauri.
4. Alpha Centauri is 4.3 light-years away.
5. (a) 490 light-years away means that light from Beta Centauri takes 490 years to reach Earth, or light reaching the Earth now left Beta Centauri 490 years ago.
(b) Since Alpha Centauri is only 4.3 light-years distant, while Beta Centauri is 490 light years away, the stars cannot possibly be close together.
6. The Andromedan will see Earth as it was 2 million years ago.

Note: Students really enjoy discussions about looking back in time.

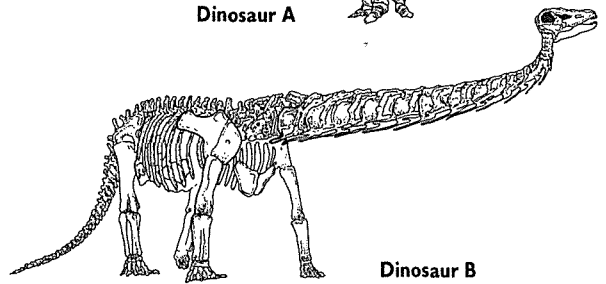
BLM 10: Earth's most important neighbours: Barrier and traditional crosswords



BLM 13: Dinosaur cut-outs



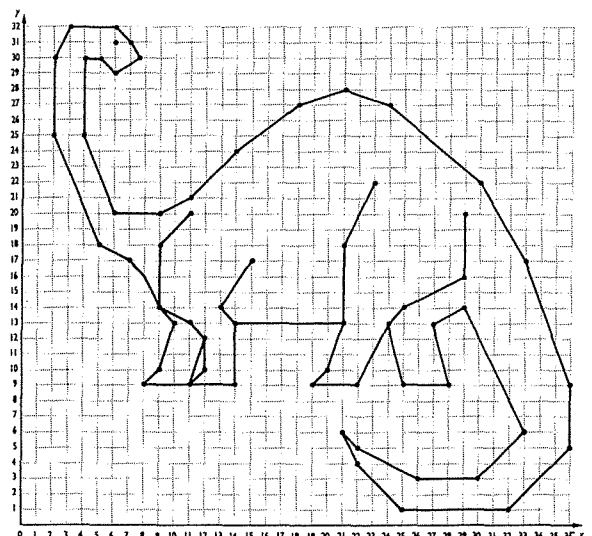
Dinosaur A



Dinosaur B

BLM 14: Who am I?

Apatosaurus



BLM 17: A family tree for people

1. fungi, bacteria and animals
2. fish, amphibians, reptiles, birds and mammals
3. monotremes, placentals and marsupials
4. primates
5. people
6. monotreme
7. (a) A placental mammal is homoiothermic, does not lay eggs, breathes air from the atmosphere and is a vertebrate.
(b) A bird is homoiothermic, breathes air from the atmosphere and has a backbone (is a vertebrate).

BLM 19: Electricity and you

1.

% of winter maximum	Season	Time of day
100	winter (maximum)	6.00 pm
35	mid-summer average	approx. 4.00 am
approx. 73%	mid-winter	12.00 noon
approx. 60%	mid-summer	12.00 noon
approx. 61%	mid-summer	5.00 pm

2. (a) 8 am and about 5.45 pm
(b) 8 am, for the following reasons:
(i) It is breakfast time for many people.
(ii) Factories and businesses start operating.
(iii) It is the peak period for trains (using electricity).
5.45 pm for the following reasons:
(i) Darkness means that lighting is needed.
(ii) Cooler weather means that heaters are turned on.
(iii) People are cooking dinner.
3. People are asleep and many businesses are not functioning.
4. The graph will have a peak during the hottest period of the day—possibly early afternoon and mid-afternoon. (Note that energy usage is higher already in some developed tropical areas of the world, because people use more power to keep cool than they do to keep warm.)
5. Answers could include the following:
(a) Turn off unnecessary lights.
(b) Use jumpers and extra blankets instead of turning on more heaters.
(c) Insulate homes more effectively.

BLM 20: Structures that transport electricity

A.

Tower number	Type of tower	Voltage carried	Height of tower
1.	Double circuit steel tower	500 kV	54 m
2.	Double circuit steel tower	330 kV	40 m
3.	Single circuit steel tower	330 kV	28 m
4.	Double circuit steel tower	132 kV	31 m
5.	132 kV single circuit wooden pole	132 kV	16 m

- B. (a) Types 4 and 5
(b) It is a double circuit steel tower that is 70 m high. (Some students may also add that power is carried at three levels.)

BLM 21: Reading your electricity meter

1. 15317 kWh
2. 3814 kWh
3. 1798 kWh
4. 82613 kWh
5. 6540 kWh
6. 4719 kWh

BLM 22: One packaging material—glass

1. The old glass goes to the bottle merchant, and then it is taken to the glass-reprocessing plant, the bottle-manufacturing site, the bottle-filling centre, distribution centres, shops and you.
2. The arrows go both ways between the bottle filling, the distribution and the shops. These bottles are refillable bottles such as milk bottles that are used a number of times.
3. Non-recycled glass finishes up as rubbish.
4. The most common type of litter found beside the road is paper.
5. (a) glass 4% (b) cans 4% (c) plastic 18%

BLM 23: The 1991 energy challenge

1. Stanley Steamer
2. Solar Star and Rebel Cycles
3. (a) Solar Star
(b) Rebel Cycles
4. (a) Liquid fuels were used by Daihatsu Charades, Daihatsu Mira, BMW Isetta, Zeta Sport, Rover and Stanley Steamer.
(b) (i) Stanley Steamer
(ii) Daihatsu Charade
(c) (i) Stanley Steamer used kerosene.
(ii) The more fuel-efficient of the two Daihatsu Charades used diesel fuel.

5. (a) Cycles and solar-powered vehicles
 (b) *Cycles*
 Most people find cycles too uncomfortable and too people-energy dependent.

Solar-powered vehicles

Solar cars are not currently available for sale. However, they will probably not travel at very high speeds, and the vehicles themselves are apparently not particularly comfortable. (Since the solar cells are currently very expensive, outlay costs may be high to buy the vehicle, although running costs should be extremely low.)

BLM 24: Saving your skin

- Melanin absorbs harmful radiation from the Sun.
- Australia has the highest rate of skin cancer in the world.
- Skin cancer is caused by spending too long out in the sun.
- Staying out of the Sun whenever possible is probably the best way to avoid skin cancer. People who work outside should use protective clothing and sunscreens.
- (a) SPF of 12 = $12 \times 12\frac{1}{2} = 150$ minutes = $2\frac{1}{2}$ hours
 (b) SPF of 15 = $15 \times 12\frac{1}{2} = 187\frac{1}{2}$ minutes or just over 3 hours.

BLM 25: The growth of the baby

- (a) 10 cm long at approx. 11–12 weeks
 (b) 20 cm long at approx. 19 weeks
 (c) 30 cm long at approx. 26 weeks
 (d) 40 cm long at approx. 33–34 weeks
 (e) 50 cm long at approx. 40 weeks
- If the baby is 20 cm long, it is approx. 25 weeks, so there should be 15 weeks remaining. June 1 plus 15 weeks = September 14



BLM 27: What's that gas?

Chlorofluorocarbons

BLM 28: Indicating acids and alkalis

- A good indicator has distinctly different colours in acidic and alkaline solutions.
- The petals of yellow marigold, yellow dandelion and orange nasturtium, and green spinach leaves were not different colours in acid and alkaline solutions.
- (a) orange (b) pink (c) colourless
- (a) yellow (b) green

BLM 29: Acid rain

- (a) SO_2 , (b) HNO_3 , (c) H_2SO_4 , (d) NH_3
- oxides of nitrogen and sulfur
 (Some students may also include oxides of carbon.)
- The oxides may fall to the ground as they are or the oxides may dissolve in water to form acids.
- (a) Trees and other plants may die.
 (b) Heavy metals may be leached out of soils thus polluting rivers etc.
- (a) ammonia
 (b) urine of animals

BLM 31: Reading barometers

- (a) approx. 982 or 983 hPa (b) 995 hPa
 (c) 1005 hPa (d) 1020 hPa (e) 1015 hPa
 (f) 1010 hPa
- (a) The weather has probably changed from being fairly fine to rain.
 (b) The weather improves to a reasonable day.
- The barometer reading usually falls (sometimes very rapidly) as the storm approaches.

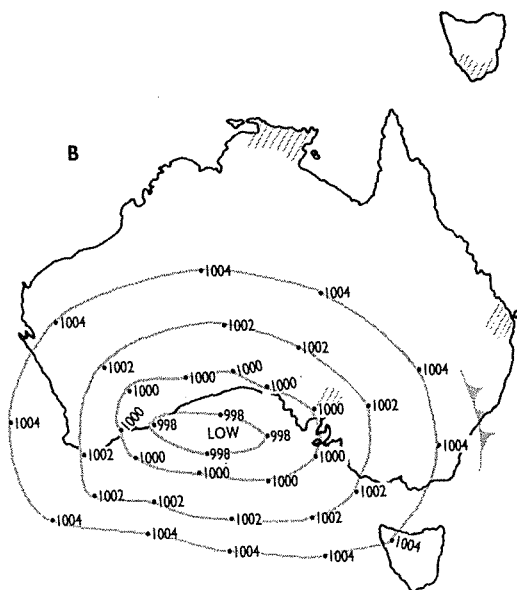
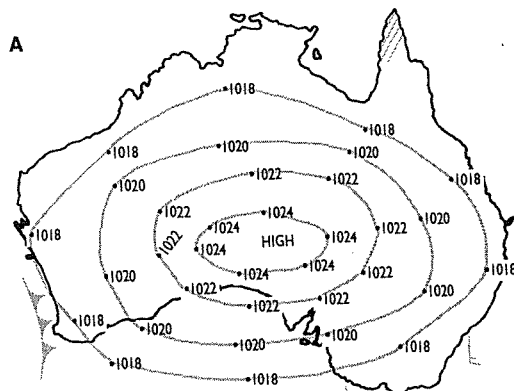
BLM 32: Working out relative humidity

- Dry bulb = 26°C
 Wet bulb = 20°C
 Difference = 6°C
 % humidity = 58
- Dry bulb = 26°C
 Wet bulb = 15°C
 Difference = 11°C
 % humidity = 29
- Dry bulb = 30°C
 Wet bulb = 20°C
 Difference = 10°C
 % humidity = 39
- Dry bulb = 35°C
 Wet bulb = 25°C
 Difference = 10°C
 % humidity = 44
- Dry bulb = 40°C
 Wet bulb = 30°C
 Difference = 10°C
 % humidity = 48
- Dry bulb = 35°C
 Wet bulb = 30°C
 Difference = 5°C
 % humidity = 69 or 70

7. Dry bulb = 10°C
Wet bulb = 5°C
Difference = 5°C
% humidity = 44

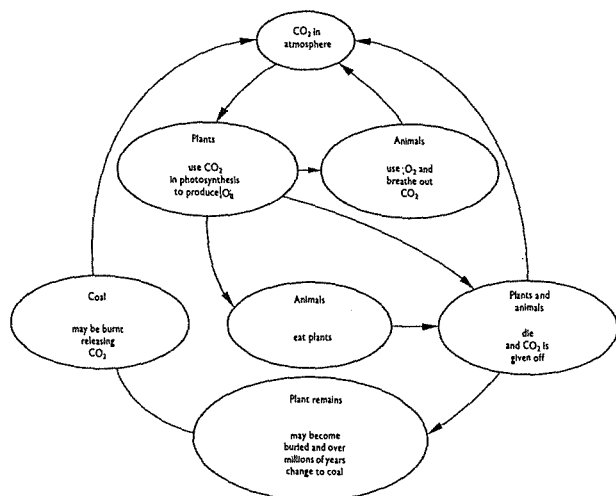
8. Dry bulb = 15°C
Wet bulb = 10°C
Difference = 5°C
% humidity = 52 or 53

BLM 33: How does a meteorologist draw a weather map?



BLM 34: The carbon cycle

See diagram.



BLM 36: Dams and their impact

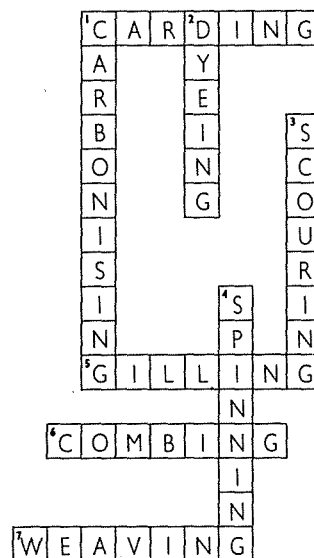
Good features may include the following:

- Water is available for drinking, agriculture and generation of hydroelectric power.
- There is public access to an area previously inaccessible.
- Opportunity is provided for water sports.

Bad features may include the following:

- Habitat for native animals and plants is lost because of flooding and changed watercourses.
- Silt is no longer carried naturally downstream.
- Trees are drowned in the dam, while trees further downstream may die because of lessening of water supply.
- Public access may mean problems for remaining wild-life.
- Migration of fish is stopped.

BLM 37: Processing wool: Barrier and traditional crosswords



BLM 40: Chapter 1 topic test: Machines and devices

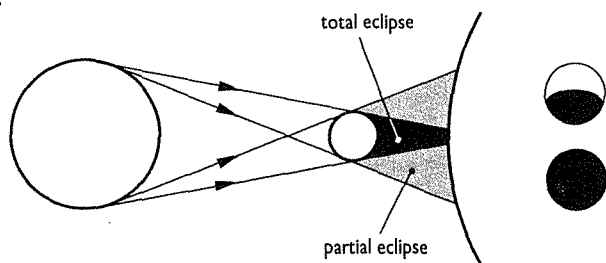
- (a) 2. (d) 3. (d) 4. (c) 5. (b)
- (a) machines (b) current, circuit (c) lever (d) wheel (e) electronic component (f) arch (g) battery (h) structure
- Students may mention electrical appliances, cars and so on that were not invented 100 years ago. Any reasonable answer should be accepted.
- (a) first (b) second (c) first (d) third
- (a) The aim of the experiment may have been to investigate how much mass the bridge could support by varying the number of strings holding the bridge.
(b) Conclusion: More strings supported more mass.

- (c) Other tests that could be done include:
- changing the materials in the actual bridge instead of the supports;
 - changing the length of their suspension bridge.
- (This part of the question can be answered in a variety of ways, since the question was intentionally vague.)

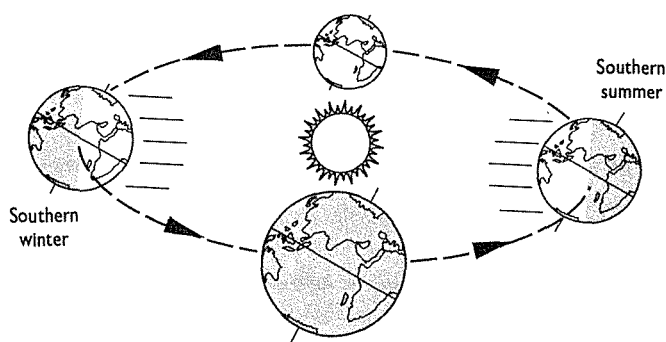
BLM 41: Chapter 2 topic test: Earth's most important neighbours

- (d) 2. (b) 3. (a) 4. (b) 5. (c)
- The layers are the core or interior, the photosphere, the chromosphere and the corona.
- The Sun, Moon and Earth must be lined up, preferably with the Moon between the Sun and the Earth.

8.



- Sunrise times are getting earlier each day.
 - These days are in summer. There is about 13 hours of daylight. (Days becoming longer may be an answer given by students. The difficulty here is that after the summer solstice the days shorten, but the season is still summer.)
- (i) 1.4 m (ii) 0.5 m
- Voula is correct. The temperature of the Earth's surface is related to the intensity of the Sun's rays that are reaching the Earth. In the wintertime the Sun's rays are at a greater angle, and so there are fewer of the rays per unit area compared with in the summertime.



BLM 42: Chapter 3 topic test: Changes in life forms and living communities

- (b) 2. (c) 3. (a) 4. (d) 5. (b) *Note:* The weevil has been released and has successfully killed salvinia. Once the salvinia dies, the larvae die of starvation, and so the weevil is not a problem.
- large beak, webbed feet
 - large beak acts as a water scoop to enable the bird to catch fish more easily. Webbed feet are used for swimming.
- Note:* Only one explanation is needed.
A carbon imprint of a leaf may be formed if a leaf falls into still water. It is buried under more and more layers of sediment. After millions of years, the sediment has been turned to rock and only the carbon that was in the original leaf remains.
A mould of a shell forms when a shell is buried under layers and layers of sediment. The shell is surrounded by material that eventually turns to rock, which retains the shell's outer shape or mould. If the shell itself is replaced by minerals, this mineral shell is the cast.
- leaves (v) and (w)
 - These two leaves have the most characteristics in common, for example veins and shape.
- Students will probably say that yellow Zottians should hide in Zatland and that green Zottians should hide in Zetland. However, all Zottians may hide in Zetland, provided the rainforest gives adequate coverage.
 - If students choose the first answer, their reason should be camouflage. If they choose to hide all the Zottians in the rainforest, then the rainforest must provide places for the yellow Zottians to hide.
- plankton → krill → baleen whales
 - People are removing the krill from this chain.
 - Baleen whales will have no food and they will die of starvation. Plankton will flourish because there will be no krill to eat it.

BLM 43: Chapter 4 topic test: Obtaining and using energy

- (d) 2. (a) 3. (b) 4. (a) 5. (c)
-

Method of power production	One advantage	One disadvantage
(a) nuclear	renewable	radioactive wastes
(b) wind	renewable	noise
(c) hydroelectricity	renewable	damages environment during construction
(d) coal-fired	cheap	pollution of atmosphere, non-renewable
(e) tidal	renewable	may upset aquatic environment

7. Any four reasonable ways should be acceptable. Ways to save energy at home could include:
- turning off lights when not needed
 - having showers instead of baths
 - having cold showers
 - brushing teeth using a cup of water instead of allowing the water to run
 - washing the car using a bucket of water instead of allowing the water to run
 - using cold water for laundry
 - recycling glass, paper, metal and plastic materials
 - reusing containers instead of throwing them away
8. (a) Three ways to conserve energy are to:
- reuse goods
 - recycle goods
 - reduce the amount of rubbish
- (b) Wood from fallen trees may be mulched and sold as fertiliser.
- (c) Uses for recycled plastic include making outdoor furniture, children's playground equipment, garbage bags and containers.
- (d) One of the following: glass, paper, aluminium cans.
- (e) Gas obtained from rotting rubbish may be used as a fuel to produce electricity.

BLM 44: Chapter 5 topic test: Changes as people grow

1. (c) 2. (b) 3. (d) 4. (b) 5. (a)
6. (a) testes (b) ovaries (The pituitary gland is also an acceptable answer for (a) and (b).)
7. (a) testis (b) sperm duct (c) penis
(d) Arrows should go from the testes, around the sperm duct to the penis.
8. Health problems that may occur in the reproductive system include venereal diseases and cancer—cancer of the cervix for women and cancer of the prostate for men. (Only one answer is needed.)
9. (a) identical twins
(b) Identical twins occur when one sperm fertilises one ovum, and the fertilised egg then splits into two identical fertilised eggs. Non-identical twins form when two sperm fertilise two different ova.
10. (a) (i) Ethiopia (ii) Sweden
(b) (i) Ethiopia (ii) USA
(c) Yes, the country (Ethiopia) with the highest infant mortality rate per 1000 babies born is also the country with the highest birthrate per 1000 people.
11. Young skin contains larger amounts of *oil* and *collagen* than older skin. Oil makes the skin smooth and stops it from being dry, while collagen makes the skin elastic.

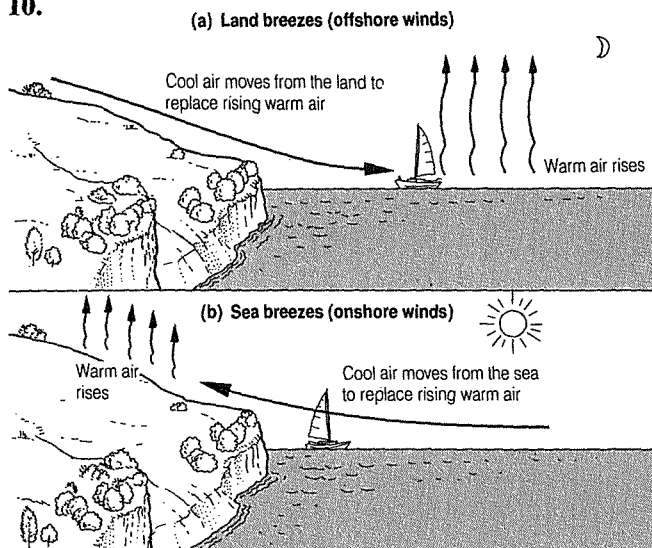
BLM 45: Chapter 6 topic test: Changes in the Earth's atmosphere

1. (c) 2. (b) 3. (b) 4. (d) 5. (a)
6. (a) False (b) True (c) False (d) False (e) True (f) True
7. carbon dioxide
8. Monsoons are winds that blow regularly and change direction every six months. (Students may add further information, including the following: Monsoons bring rains to the tropical rain-forested areas of the world, for six months of the year. The winds then reverse direction, blowing out to sea for the next six months.)

9.

Weather instrument	What it measures	Units used
barometer	air pressure	hectopascals
anemometer	wind speed and direction	kilometres per hour (km/h)
hygrometer	relative humidity	percentage humidity
rain gauge	rainfall	millimetres (mm) or centimetres (cm)

10.



11. (a) Students need provide only two examples. Examples of substances that enter the atmosphere when a volcano erupts include gases such as steam, carbon dioxide, nitrogen, sulfur-containing compounds and traces of hydrogen and helium, and solids varying in size from huge rocks to particles of fine dust. Sometimes the element sulfur is also produced in an erupting volcano.
- (b) Volcanoes may cause reddened sunsets as a result of the extra dust particles in the atmosphere. Also, if the eruption was powerful enough, there could be a lowering of the temperature due to the clouding of the Earth by the dust particles. (Note: this latter effect is more likely to be more localised.)

BLM 46: Chapter 7 topic test: Obtaining and using substances

Part 1 Water

1. (b) 2. (c) 3. (d)
4. Chlorides are added to kill bacteria.
Fluorides are added to cut down tooth decay.
(Students need not name the chemicals involved; only the reason need be given.)
5. Water-holding rocks that can produce ground water are called aquifers.
6. Add a few drops of detergent or soap to a sample of the water and shake the mixture. If the water is hard, froth will not form and a layer of scum will form around the top of the water.
7. pH = seven
8. (a) Position Y
(b) Position Y has shallow topsoil, with clay underneath. The topsoil could be removed and the clay should hold the water so that the dam does not leak. Also, Position Y is in an open area, and so little damage would be done to the local habitat to construct the dam.

Part 2 Wool

1. (c) 2. (a) 3. (b)
4. Sheep overgrazing may cause the ground to become bare. Once the ground is bare, weathering and erosion occur, making it difficult for plants to regrow.
5. Only two properties are requested. Properties could include the following:
 - Wool is a good insulator (against cold and sound).
 - Wool can hold a large amount of water, without the fabric actually feeling wet (making it an ideal fabric for clothing).
 - Wool does not burn easily.
6. Scales on the surface of the wool cause woollen fibres to mat together.
7. (a) Wool, because it is difficult to burn and it burns slowly.
(b) Flames would probably spread most quickly through cotton, because it burns quickly and easily. (Nylon tends to melt rather than burn.)

Part 3 Sugar

1. (b) 2. (d) 3. (a)
4. Two of the following: sedimentation, evaporation, centrifuging
5. Any reasonable answer should be accepted. 'Growing sugarcane requires energy' because machinery is used for planting, keeping the crop free of weeds, fertilising, irrigating and harvesting. Energy is also used to transport the cut cane to mills.

6. Only (a) *or* (b) should be marked!

- (a) Any sensible method of separating the sawdust from the sugar should be accepted.
- If the sawdust was all coarse, some students may suggest simply sieving the mixture.
 - To obtain a more pure sugar sample, it would be best to dissolve the mixture in warm water (hoping that nothing nasty comes from warm sawdust). Then the mixture could be filtered, and the sugar recrystallised by carefully evaporating the water.

or

6. (b) Two examples must be given. Examples could include the following:
- Initial clearing of land for planting means that native animals and flora lose their habitat.
 - Chemicals added to cane fields to increase the crop yield and to destroy pests may reach waterways causing problems for aquatic life.
 - Irrigation channels may upset the natural flow of the original watercourses causing problems for the environment.
- (Some students may add general comments about machinery using fossil fuels producing greenhouse gases and so on.)

Part 4 Steel

1. (c) 2. (a) 3. (c)
4. coal, iron ore and limestone (Students should be able to work these out from the next two questions!)
5. Coke is formed after coal has been crushed, washed and baked in special ovens.
6. Iron ore comes from the Hamersley Basin, WA. Limestone comes from Marulan, NSW.
7. (a) Slag is the substance that floats to the top of molten ore. It contains the impurities.
(b) Slag forms after limestone is added to the furnace. (The limestone absorbs the impurities and floats to the top.)
8. Any reasonable answer should be accepted here; for example, pollution control, rehabilitating mine sites, using the waste products of the process so the wastes do not simply pile up.

BLM 47: Equipment review

1. (a) beaker (b) bosshead (c) clamp (d) retort stand (e) Bunsen burner (f) measuring cylinder (g) tripod (h) evaporating basin (i) gauze mat (j) test tube (k) conical flask
2. (i) measuring cylinder
(ii) beaker, tripod, gauze mat, Bunsen burner
(iii) evaporating basin, tripod, gauze mat, Bunsen burner
(iv) retort stand, bosshead and clamp

3. • Close the hole on the tube of the Bunsen burner.
• Attach the Bunsen burner to the gas outlet.
• Light the match or have the gas lighter ready.
• Turn on the gas.
• Light the gas.
• Adjust the flame.

BLM 48: Reading scales

(a) 12 (b) 1.25 (c) 32.5 (d) 140 (e) 8.5 (f) 15 mL
(g) 10 mL (h) 70 mL (i) 5 (j) 2.5 (k) 28 (l) 7 (m) 2
(n) 2.5 (o) 200 (p) 34° (q) 90° (r) 4° (s) -2.5°
(t) 234.7 g (u) 7.5 (v) 12.5 (w) 17.5 (x) 15 (y) 45
(z) 70